TRANSIT PERFORMANCE REVIEW GUIDELINES

PART ONE - INTRODUCTION, THE APPROACH AND REVIEW PROCESS

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Ontario
Ministry of
Transportation and
Communications

Ontario
Urban
Transit
Association

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TRANSIT PERFORMANCE REVIEW GUIDELINES

PREFACE

The objective of improved transit performance in Ontario is fundamental to the goal of improving the quality of urban life. The impact that urban transit has in this regard is often unrecognized by the public and similarly taken for granted by passengers and transit operators alike. As a result, all of us associated with urban transit - political decision makers, managers, vehicle operators, maintenance personnel and others - have something to gain from ensuring that public transit is provided in the most effective and efficient manner. Reliable and affordable public transportation services will help meet the challenge of maintaining and strengthening our urban areas, so that they are economically viable and socially attractive places where people can move safely and conveniently.

In a period of slow economic recovery, transportation will continue to experience ever increasing competition for public funds. As transit officials, we can expect far greater public pressure and scrutiny with regard to management's accountability and system performance. Even though Ontario's transit systems are viewed as second to none in North America, all of us must continue to exhibit strong leadership and foresight to ensure that our product is viewed as purposeful and resourceful.

This document has been prepared as a guide to assist transit managers in this extremely important task. It consists of a series of chapters dealing with topics considered critical to managing and operating a public transit system. This material is intended to induce transit managers to review current practices and to stimulate thinking beyond traditional considerations and, in so doing, to generate broader and more analytical perspectives that will yield maximum benefit for every transportation dollar spent.

The Guidelines have been prepared, edited and published by the joint Ontario Urban Transit Association/Ministry of Transportation and Communications Transit Productivity Committee. The Committee was assisted by selected transit consultants recognized as experts in their particular field. We acknowledge the significant contribution that each of these individuals have made to the Guidelines. All of the Committee members and the consultants participated with vigour and commitment throughout the entire exercise.

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Transit Productivity Committee

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PART ONE

1 INTRODUCTION

These performance review guidelines are designed to help Ontario transit managers focus quickly, over an 8 to 10 week period, on where there may be significant opportunities to improve the overall performance of their system. They also are intended to assist them in their continuing efforts in this critical area for management in the future. The guidelines reflect the experience gained by the transit industry in Ontario, and elsewhere in Canada and the United States, in evaluating their performance and in demonstrating if public support for transit is paying off.

The guidelines have been produced by the Ontario Urban Transit Association and Ontario Ministry of Transportation and Communications through their Transit Productivity Committee, which includes representatives of transit management and Ministry staff. The Committee's objective is to assist all Ontario transit systems to maximize the effectiveness and efficiency with which they fulfill their responsibilities to their local communities. The Committee's Terms of Reference are given in Appendix A.

The guidelines are divided into three parts for ease of reference. Part One explains why it is more important than ever for managers at all levels to review and strive for improved performance, who should be involved, what should be reviewed and how the suggested review process works. Part Two deals with the activities that determine the overall resources in manpower and equipment needed to run a transit system. These include management and administrative methods, strategic decision making, and planning. Part Three covers the important activities that relate to the day-to-day operations of the system in the assignment of operators and vehicles to service on the street and to the maintenance of equipment and plant.

Parts Two and Three are checklists of the factors influencing transit performance and some basic questions that each manager and his staff should address to assist them in reviewing their performance.

A Record of Achievement

In 1972 the Ontario Government introduced a program of funding assistance for Ontario municipalities to encourage them to build up and improve their transit systems. Ontario recognized that efforts during the Sixties to make transit an attractive alternative to the private automobile, while meeting costs out of the farebox, had failed with few exceptions. Despite the best efforts of transit managers, transit service was cut to the bone in most communities. It was apparent that without continuing municipal and provincial support transit could not continue to serve those who did not drive, nor play a role in relieving traffic congestion, urban sprawl and the cost and disruption of building new roads.

Given this shift in emphasis in urban transportation priorities, cities and towns were able to revitalize their transit systems. Over the ten-year period to 1982, the number of Ontario communities enjoying transit service increased from 46 to

71 and ridership grew by over 30 percent to 620 million passengers annually. This remarkable growth has shown what the Ontario transit industry can accomplish when the role of transit services are understood and widely accepted by the public, both users and non users, and supported by politicians at both the provincial and municipal level.

Over the past ten years, this support has taken the form of an investment in capital and operating subsidies of $2 billion by the Ontario Government and $1.3 billion by the local municipalities. In 1982 the investment by the Province was $200 million and $130 million by the local municipalities. These are significant amounts by any measure. They were made possible because transit was recognized as one of the top priorities to attain the social and economic goals for healthy community growth. The funds were available to meet these expectations in a bouyant economy. This kind of support was brought about by transit management demonstrating that the money invested in new equipment and improved service was worthwhile, both in serving their municipality's transportation and development goals and in improving the efficiency of service on the street. They must increase their efforts in this regard.

The Challenge

Now, in a period of economic constraint, senior governments and municipalities are being forced to examine their priorities in an effort to control or cut costs while maintaining services to the public. This is a tall order. It means greater accountability, more competition for public funds, tighter budget control and closer scrutiny in selecting between priorities. Transit is no exception and some municipalities have already imposed budget cuts that have curtailed expansion plans or reduced service. This approach to public spending can be expected to continue even with an upturn in the economy.

It is clear that in this kind of situation, those responsible for transit must not only satisfy themselves that they are running a tight ship but they must also take steps to convince the public and local and provincial politicians that the investment in transit is being managed efficiently. Otherwise there is a risk that funds will be channelled elsewhere where pressures are greater or where it is perceived that the available funds can be used to better advantage. In short, this means that all managers will have to be prepared to evaluate and explain their performance against a background of austerity, where the tough questions are not only how to stick to restraint guidelines but also how to avoid any increase at all or even to reduce costs.

This is why the Transit Productivity Committee produced these guidelines. The Committee believes that by bringing together the collective experience of transit managers in Ontario and elsewhere that it will give everyone fresh ideas on how to question, analyze and evaluate the performance of their system. The guidelines are designed to assist management in identifying what the review process should cover, who should be involved in it and how improved performance can be used to meet the challenges facing them now and in the foreseeable future.

2 THE APPROACH AND REVIEW PROCESS

Performance in transit is no different from any other business, whether large or small. It is a combination of being effective - doing the right things; and being efficient - doing these things well. In short,

GOOD PERFORMANCE = EFFECTIVENESS + EFFICIENCY.

In a private business the final measure of performance is profit or loss. If there is no market for the proverbial 'widget', then the business will not be effective and it will fail, no matter how efficiently the widgets are produced. Conversely, the widget maker will also fail, even where there is a market, if he cannot produce his product efficiently at a price his customers can afford.

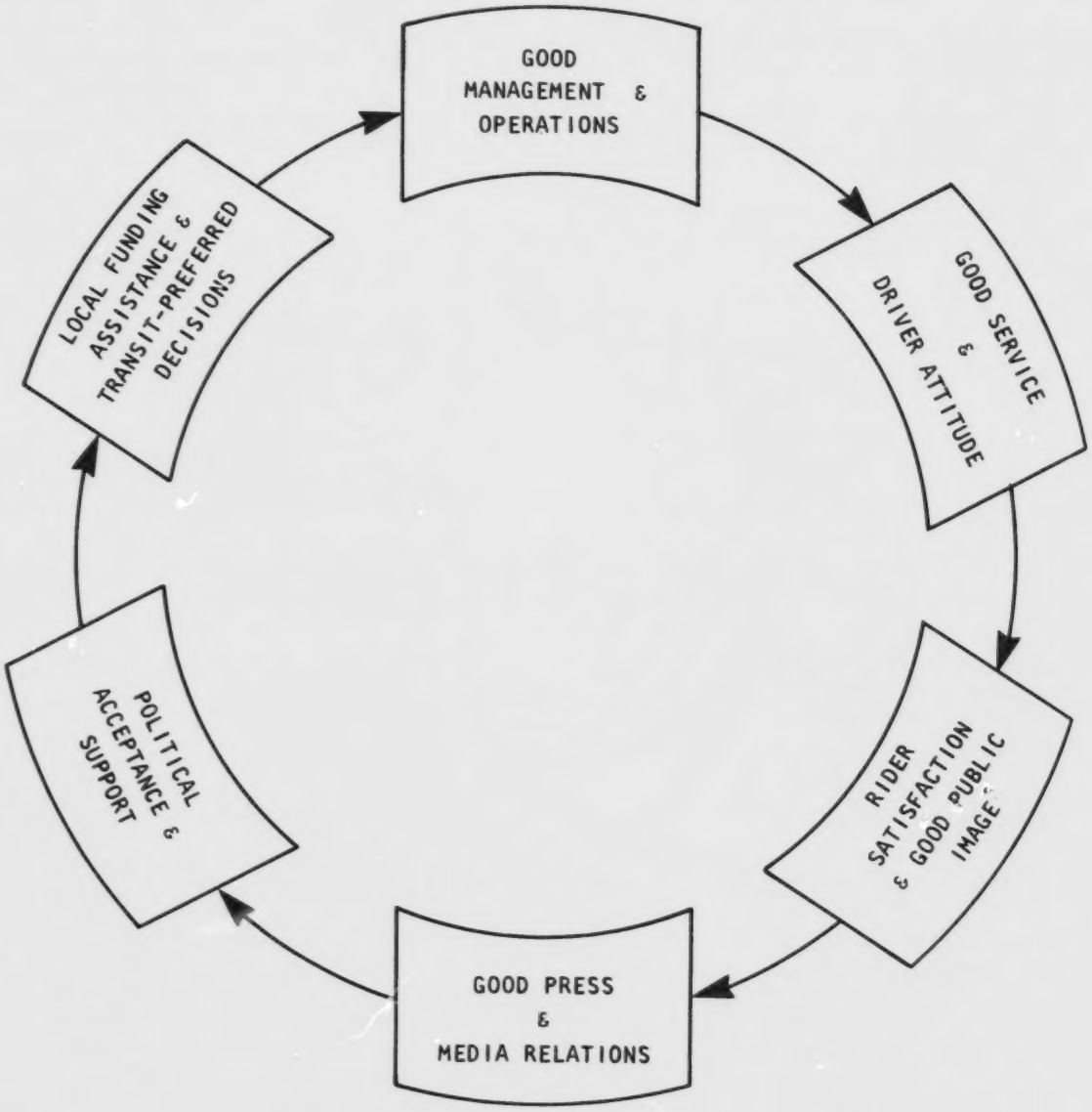
The performance of municipal services, like transit, are judged in different terms but no less demanding ones. Their success, or lack of it, is judged by the extent to which the taxpayers and their elected representatives will continue to support the community benefits and to accept the resulting costs of the service. This is achieved by demonstrating that transit is both effective and efficient, as illustrated by the 'transit performance loop' in Exhibit 2.1. All of the links in this loop interact in achieving effective and efficient service. Transit managers cannot afford to neglect any one of them in attaining good performance and community support for their system.

Effectiveness

Effectiveness means achieving a desired effect. In transit this relates to how well the service meets the needs of the passengers and other community goals for the system as set by policy. It is evaluated using measures such as ridership per capita or passengers per revenue hour. These basic goals or strategic policies are set by the policy group responsible to the public for the service, i.e., the Commission, Council or Committee of Council. They define the quality and quantity of service to be provided, the fares to be charged for the service and determine to a large extent the equipment and staff resources required to operate the service. Consequently they are one of the significant areas for review.

Setting and reviewing policies is no easy task but it is fundamental to good performance. The policy group has the difficult job of deciding how to tailor transit service to what the public expects, as compared to what the community can afford, considering the competing demands of other community services for the available funds. These decisions must be made by the policy group but it is a primary responsibility of management to keep the policy group informed of what the transit service is accomplishing and where and how policies and strategies can be modified to get the most effective service for the money available. In turn, the policy group should expect and encourage management to take the initiative in assisting them to obtain the information needed for strategic planning. They should also recognize that management is operating in a vacuum unless it has specific direction as to the level of service the community requires

TRANSIT PERFORMANCE LOOP



IF ANY LINK IN THIS LOOP BREAKS DOWN,
EFFECTIVE AND EFFICIENT URBAN TRANSIT MAY NOT BE ATTAINED.

EXHIBIT 2.1

and can afford. Clearly, this means good communications between the management team and the policy group as well as between them and the public.

Efficiency

Efficiency in transit means delivering the service as determined by policy at minimum costs. In other words, the objectives of management are to utilize the human and equipment resources at their disposal in the best possible way to achieve optimum productivity. Typical measures of efficiency are cost per vehicle kilometre or cost per vehicle hour.

Transit service is labour intensive and improved staff productivity can have a major impact on efficiency since wages and salaries make up approximately 70 percent of total operating costs. Consequently, the main task of transit management in achieving excellence in performance is to channel their staff's efforts in the most efficient way.

This too is not an easy task but a challenging one. Firstly, it means making work meaningful and satisfying for all staff through good communications. Secondly, it means providing staff with the tools, procedures, good working conditions, training, equipment and supplies that will help them to do a better job. Some of the main constraints on employee satisfaction and productivity seem to be a result of the labour contracts negotiated between management and the unions. While these are designed to prevent abuse by both parties, they are often based on protecting against the 'worst case' and are often applied by both sides as if this was the norm. These attitudes are counter-productive. They have to be overcome if the industry is to achieve greater employee satisfaction and motivation and consequently better efficiency in the use of manpower. This can only come about through better communication to avoid grievances and, if this fails, through bargaining in which both sides are well informed, respect the other and recognize their mutual interests in conveying to the taxpayers that the transit system is being run efficiently.

In short, transit system performance depends on both effective policies and efficient operations. Management has the dual responsibility of advising the policy group where policies need to be modified to suit changing conditions and in organizing the operation so that all staff can work productively as part of the transit team.

2.1 EVERYONE CONTRIBUTES TO PERFORMANCE

Since the performance of a transit system depends to a large extent on how well everyone understands and performs the activities assigned to them, good two-way communications are essential: between the policy group and management, within the management group itself and with the employees. Experience has shown that a team approach will pay off over the short and the long-term. It will create an environment which will motivate every employee towards improved productivity in his own work and in the use of equipment and plant. Everyone wants to do a better job and to have some say in how this can be

accomplished. Consequently, the following factors are of key importance in carrying out a performance review.

- Transit is not a one-man show, it is a team effort. The review must involve those responsible for both the policy and management activities under review to obtain their input and committment to the process.

- Of equal importance, the review must examine how effective management is in providing leadership and participation for all staff to achieve top performance.

- Good performance is in everyone's best interest. The review must be carried out to identify areas to improve performance and to assist everyone in doing a better job, not to allocate blame.

This means that the review has to be a team effort carried out in a positive way with the objective of making it easier for everyone to perform well. In larger properties the review team should include department heads, who in turn should present the views of their supervisors and foremen and through them all transportation and maintenance staff. In smaller properties, communications are easier and management can work directly with their supervisors or staff. In all cases policy input is critical at some stage in the proceedings, preferably from the start. Where the transit manager reports directly to a Commission or Committee of Council this should pose no problems. Where he reports through a City Manager or other official, this person should be a part of the review team, or should be fully informed of its work, so that the message is not lost somewhere between the transit manager and policy group.

With this approach, the task of reviewing performance can be shared, while gaining the benefit of cross fertilization of ideas between those who are involved in day-to-day operations and those who have staff functions in planning and in providing administrative support services. Many managers do this now at regular staff meetings but sometimes these are more concerned with putting out fires than with finding out what caused the fire in the first place. Managers themselves can get bogged down in the routine but essential day-to-day business of running their operations and that is why we all have to be reminded to step back from time to time to take a fresh look at performance and the external and internal factors that influence it.

2.2 EVERYTHING CONTRIBUTES TO PERFORMANCE

Every activity performed by the organization contributes to its overall performance as seen from the outside and from within. Experience suggests that the following factors are of key importance in carrying out the performance review:

- System performance is the end product of everyone's actions. Therefore the review must cover policies as well as operations. Major activities should be broken into work related sub-activities that can be easily understood and isolated for evaluation.

- Performance has to be measured against targets which can be understood and will be accepted by everyone involved. These measures can be qualitative or quantitative but they must be clear, simple and use information that can be readily obtained.

In short, all of the activities that collectively influence overall performance should be reviewed to answer the two basic questions. Are we doing the right things? Are we doing those things well?

The activities that influence performance in transit systems, whether large or small, are shown in Exhibit 2.2. These are:

- General Management and Administration Support
- Strategic Decision Making
- Planning
- Transportation Operations
- Equipment and Plant

As this exhibit illustrates, all of these activities contribute in influencing performance. Transit systems are established going concerns and constant feedback is necessary between these activities to adjust to changing conditions.

Each of these major activities is the subject of a separate chapter in the guidelines which discuss in detail the factors influencing performance, the measures and information of value in the review and the key questions to be addressed when assessing that activity. The material in each chapter is basically a checklist to help management to focus quickly on areas where performance standards are high and no action is necessary, or not up to expectations and where corrective action or further study is necessary. It is designed to be of assistance not only in the initial review process but also in the ongoing program for improving areas of weakness. Because the material attempts to cover the broad range in size and complexity of Ontario transit systems some aspects may not be applicable.

A summary of the activities covered in each chapter follows.

General Management and Administration - Chapter 3, Part Two

This chapter deals with all of the activities which support the overall operation of a transit system. General management covers the broad area that provides leadership in translating policies into efficient operations through motivating staff and coordinating their activities in the most productive way. Administration includes the support services that are concerned with financial management, management information systems, public relations, labour relations, personnel management and marketing, all of which have to be done well to achieve excellence in overall performance.

While management and administration are not a major cost item in transit, roughly ten to fifteen percent of total costs, they have a profound impact on management's ability to control costs, improve ridership and bring about good

ACTIVITIES INFLUENCING SYSTEM PERFORMANCE

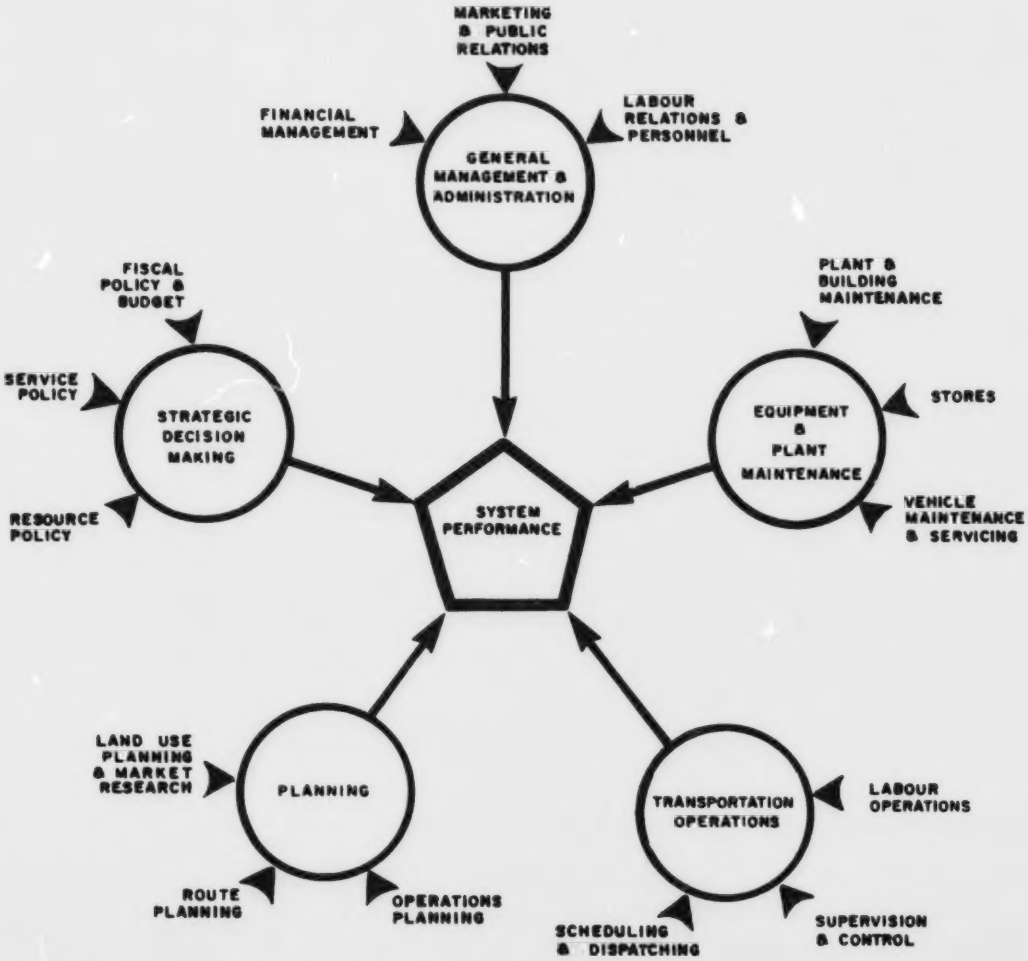


EXHIBIT 2.2

communications and a better working environment to achieve better performance all round.

Management and administrative practices can become a matter of routine where there is a danger of resistance to change and complacency where the status quo is tolerated. The review should question if there are good communications between management and staff and if the support services in place are efficient in making work productive for all staff and effective in responding to their needs. It should also question if good customer and media relations are enjoyed and if these important areas can be reinforced.

Strategic Decision Making - Chapter 4, Part Two

Strategic decision making sets the future direction and policy for the transit system considering the needs of the community and the resources available to meet those needs. These policies have a major influence on the quantity and quality of service to be provided, the fare levels to be charged, funding requirements and the type of organization which operates the service. Since these policies have a major impact on the manpower and equipment needed to operate the system, its financial performance and shaping its future requirements, they are an important area for review.

The key questions to be raised concerning service policies should confirm if these are achieving the desired results or should be modified in the light of changed conditions. Depending on the size of the community and its policy, service policies can range all the way from serving those who do not have access to a car; to attracting motorists to transit in the interest of reduced congestion, less cost for road improvements, conserving energy or more efficient land-use development.

Fares and funding policies are the major determinants of financial policy. In a time of austerity the key questions are: Can the fares be adjusted? Should the transit budget be frozen or reduced until the economy picks up? Answers to these questions will influence future plans to a major extent.

Strategic plans and policies are not cast-in-stone and must be reviewed and modified when necessary to meet changing conditions as and when decided by the policy group. This should be done annually. Involvement in this process by the transit manager, through good communications with the policy group, is an essential part of his job. He has to live with these decisions and make them work.

Planning - Chapter 5, Part Two

Planning is the link between the strategic decisions and the delivery of service for passengers. It provides information to assist management and the policy group in setting goals and objectives for the system and translates these into routes and schedules for the day-to-day operation of the service. As such, it influences both the effectiveness and efficiency of the transit system to a major degree.

In the strategic and policy areas, the important questions in reviewing planning activities are: Do they provide information on trends such as population growth and distribution and on the transportation needs of the public? Do they assist management to understand the nature of the market they are trying to serve and to plan for this? Are service standards defined to guide operational planning? OR, is seat of the pants planning good enough for planning ahead?

On the operational side the review should question if the route network should be altered or extended to meet changing demand, if the schedules are based on up-to-date ridership information, if schedule speed can be improved through traffic management methods, if loading standards are too generous or result in overloading. All of these have a major impact on the fleet size and the efficiency of the transportation department.

While the complexity of the planning process relates to the size of the community being served, it is an essential but often ignored area which can significantly improve the overall performance of a transit system irrespective of size. In many cases, information and assistance can be made available through City Planning and Traffic Departments to help management in this important task.

Transportation Operations - Chapter 6, Part Three

Transportation operations involves running the day-to-day service on the street. As such, it is the major component and makes up over two thirds of transit operating costs. This activity schedules and dispatches crews and vehicles to meet the service requirements as determined by the planning function, supervises service to assist operators to maintain their schedules and provides a control function to rectify problems due to breakdowns or emergency situations as and when they occur. The drivers and supervisors performing this activity are on the front line. Their performance has a major influence on how the transit service is perceived by the public and the efficiency of the overall operation.

In reviewing the quality of transportation service the important questions relate to on time performance, safety, courtesy and driver skills. All of these reflect the drivers' attitudes and the support and training they received from management to help them to do a good job.

In reviewing the efficiency of transportation service, the skills of the scheduler and the dispatcher are all important in assigning regular and spare crews to achieve productive time, within the limitations of the peak and off peak service requirements and the labour contract. The ratio of driver productive time on the street to pay hours is a key to efficiency in transportation operations. This should be examined to determine if changes in scheduling and dispatching methods or in working rules and labour contracts can bring about improved performance.

Equipment and Plant - Chapter 7, Part Three

This activity provides the transportation department with the vehicles necessary to operate the service as and when required and maintains and manages buildings. It too is an important area for review as it makes up 15 to 20 percent of total operating costs and has a major impact on service reliability and the image of the transit system for passengers. The two main elements to be examined are servicing and maintenance since both contribute equally to service quality and costs.

Servicing covers the cleaning, fuelling and other mechanical and safety checks necessary to have the bus ready to go out on its next run. Maintenance covers the inspection, repair and rebuilding of the vehicles on a scheduled basis for preventative maintenance and as necessary to repair breakdowns or accident damage.

The repetitive nature of servicing and maintenance activities lend themselves to work methods and the use of tools to help staff to work more productively. The review should question if these are in place and if staff are well trained in their duties. It should also look at the frequency of breakdowns, how often vehicles are not supplied to meet the requirements of the operating department and the ratio of the fleet available for service, as measures of the efficiency of the equipment department.

2.3 THE REVIEW PROCESS

Up to this point we have examined why it is important to review performance now, what should be reviewed and who should be involved. The next and final step is to suggest how the review should proceed.

A two-phase procedure is strongly recommended. The first phase is intended as an appraisal of all activities to quickly identify the strengths and weaknesses in overall performance and where the priorities lie to achieve better performance. An eight to ten-week period is suggested for this phase, otherwise there is a strong possibility that the review will bog down in detail and the review team will lose its sense of urgency. The second phase would examine the priority areas for improvement identified in the first phase. This would be necessary where short-term action is not obvious and further and more detailed study is required to identify the source and correct the problem.

The process suggested for Phase One should be applicable to all systems irrespective of their size. However the items to be covered, as discussed in the subsequent chapters, may not be applicable to all systems or may have been covered recently, in which case the review process can be adjusted to suit. It is not suggested how Phase Two might proceed, since this will depend on the nature of the activities to be investigated and must be tailored specifically to the subject. But Phase One can and should start now.

The Phase One review has five steps: organize, analyze, evaluate, report and implement. These are described below.

(1) Organize the Review Team and Program

The manager's first step is to appoint the other members of the review team who will conduct the review and coordinate any other staff input. He should obtain their commitment to the process as an opportunity to work together for better performance. The team should develop a realistic program to complete Phase One within an eight to ten-week period. The composition of this group is recommended in 2.1. To be effective it should not exceed six or seven members.

Prior to the first meeting it is desirable that the group should review the entire guidelines document so that at this initial meeting they can have a general discussion on the areas for review and decide how they should proceed and who should do what, by when. This should establish the requirements for and practicability of delegating specific tasks to other staff members who can contribute in a meaningful way and be part of the review team. They should also consider how to inform staff about the review in a positive way to counter any employee concerns.

(2) Question and Analyze

The next step is for each team member to question and analyze the performance of the activities assigned to them for review. To do so they can use readily available information on their internal operations from established targets, annual reports or the Ontario Urban Transit Fact Book, as measures or indicators of performance. These should be augmented with their own intuitive judgment and comments from their staff as to the areas where performance is good or poor, using the appropriate chapter in the guidelines to stimulate their thoughts and ideas in this regard. An extensive data collection exercise is neither necessary nor recommended for Phase One.

It is also useful to compare internal performance with other similar or peer properties by using the material in the Fact Book. This will provide a very general indication of potential areas where performance might be questionable. Caution must be exercised in using this information since no two systems are alike. Performance depends on the nature of the community being served, ridership characteristics, fleet condition, wage rates, all of which can vary considerably.

(3) Evaluate

In the third step the team participants use the information developed in step two to compare past and future trends and to evaluate performance in each activity under review. This should produce a list of items where performance is considered to be good and no further action is required and where performance can be improved, with priorities for action. In the latter case it may be obvious to the team that some measures can be taken to improve performance over the immediate or short-term period. These

can be put in hand wherever possible without waiting for the end of the review. In others, further and more detailed study may be required to identify the underlying problems and their solutions. These would be addressed in Phase Two.

(4) Report

During Phase One, the review team should meet at regular weekly intervals to report on progress and to compare notes on their findings, particularly those that affect the activities of others. Everyone should be encouraged to seek and give advice freely. The team members should bring forward the views of their staff, as gained in meetings with them.

At the end of Phase One, a brief report should be prepared on the results with recommendations on priorities for further action in Phase Two. This should be prepared in such a way that recognizes good performance as well as areas where performance can be improved. The areas where employee participation should be enlisted in attaining improved performance should be described. The report could then be made available to the policy group.

(5) Implement

The Phase One review will only be meaningful if its findings are followed up. This will involve implementing specific changes or identifying areas requiring more detailed study to be undertaken in Phase Two. The implementation program must have the backing of the policy group and management. It is also essential that any changes resulting from the review are monitored carefully to confirm if they are achieving the desired results or should be adjusted. Nothing new is achieved without trial and error or some failure.

In conclusion, while the review process is important, the main benefit to be derived from it is in bringing people together to think and examine their performance collectively in a constructive way. This is how excellence in performance is achieved - not through procedures, methods or tools alone. These are however important in that they are a means to help people to work productively. The following chapters in the guidelines are meant to assist in this process. They are not a text book on how to run a transit system. They are intended to help managers to take an unbiased and fresh approach in looking at every aspect of their system, with the benefit of the experience gained by others who are trying to do the right things and to do these things well.

Once areas have been identified from Phase One that require further and more detailed review, the Committee will consider all reasonable ways and means through which either the Association and/or the Ministry can assist in addressing those particular problem areas. Meanwhile, the Committee will begin to tackle the remaining components of its intended work plan as identified in its Terms of Reference (Appendix A).

The Committee is committed to working with all Ontario transit properties to meet the challenge of the future. How well this commitment can be met will depend to a large extent on the success of Phase One and the subsequent initiatives and willingness of individual properties to participate in and contribute to solutions for this critical and ongoing challenge.

O.U.T.A. - M.T.C.

TRANSIT PRODUCTIVITY COMMITTEE

OBJECTIVE

The fundamental objective of the Committee is to assist Ontario's Transit Systems to maximize the effectiveness, productivity and efficiency with which they fulfill their responsibilities to their local communities.

TERMS OF REFERENCE

BACKGROUND

Spurred by an infusion of Provincial and Municipal funding, Transit in Ontario has experienced significant and quite rapid growth and advancement in the past decade. New systems have been implemented, service has expanded overall, equipment and facilities have been upgraded and added to, objectives and perspectives have changed, system organizations have expanded, techniques and procedures have improved, and numerous other changes have occurred.

New issues, obligations and complexities in transit management have accompanied these developments, and these have necessitated continued reassessment and modification of administrative and operating practices to maintain pace with these changing roles and responsibilities.

More recently both public and private agencies have been faced with the pressures emanating from an environment of continuing fiscal constraint. As such, individual transit systems have experienced demands for budget restraint, thus requiring ongoing and careful examination of the cost-effectiveness of their system administration and operations. Through this requirement, undoubtedly, several initiatives for improved effectiveness and efficiency have been identified' and implemented in the respective systems, and as a result, Transit has generally preserved viable service to the public while maintaining expenditure levels within assigned funding allocations.

With predictions of only minor improvement in the economy, however, and with announcements of continued restraints on public spending in general, it is evident that Transit cannot expect to receive sufficient funds to meet its expectations. Therefore these efforts must be reworked and re-emphasized. All possible improvements must be defined and acted upon if Transit is to retain the high quality and level of service established over its past decade of growth.

It is unmistakably clear that each individual transit system, similar to all other public services and programs, faces an immediate future environment which will contain:

- Greater competition for public funds and therefore tighter budget limitations;
- Continued cost escalations associated with service, labour, materials, equipment, etc.;
- Increased accountability for, and closer scrutiny of, performance by funding agencies, the public and riders.

To address this challenge, each system must consciously and resolutely strive for maximum cost-effectiveness in the planning and provision of its services. Additionally, it must be fully prepared to critically evaluate all aspects of its system, its activities and its methods, to search out opportunities for cost saving. Productivity improvement must become its top priority.

In this regard, it must be realized at the outset that the productivity and performance achieved in any given transit system is the composite result of many influencing factors. A system's strategic planning efforts, its management and organizational structure, its administrative procedures, its operational activities and techniques, and its labour relations are all instrumental in affecting the end results. Consequently, an effective evaluation requires all these contributing components to be subjected to examination in a comprehensive context in order that maximum benefits and opportunities for cost savings might be identified, and rational priorities established for more detailed assessments.

ACTION TAKEN

In recognition of the difficulties and complexities associated with this subject, the variance in size, maturity and capabilities of the respective systems, and the obvious benefits to be derived from cooperation and sharing of expertise within the industry, a joint committee of the Ontario Urban Transit Association and the Ministry of Transportation and Communications has been established to provide a focus and a catalyst for pursuing productivity improvements within Ontario's transit systems.

OBJECTIVES

A Transit Productivity Committee has been established as an ongoing forum to provide leadership, guidance, technical assistance and co-ordination to transit systems in Ontario with respect to all matters influencing productivity and performance. Consequently, the scope of the Committee's interest and initiatives will be broad-based and will address productivity factors associated with the several progressive levels of system organization including policy, management, service planning and operations. In order to be successful in this endeavour, it will be essential that an effective two-way dialogue between the committee and all Ontario Transit Systems be developed and maintained.

The fundamental objective of the Committee is to assist Ontario's Transit Systems to maximize the effectiveness, productivity and efficiency with which they fulfill their responsibilities to their local communities.

In pursuing this objective, the Committee fully recognizes that the responsibility and accountability for the administration and provision of transit services rests with the local jurisdiction.

The Committee desires to:

- Increase the awareness of the importance of improved productivity and performance, and gain general commitment toward addressing this challenge;
- Increase the awareness and understanding of the many factors which influence transit productivity and performance;
- Encourage transit systems to undertake comprehensive reviews of their particular administrative and operational practices, and within its capabilities provide assistance to transit systems for implementing such reviews;

and also to;

- Identify productive and efficient procedures and initiatives which are applicable to the industry, and communicate the pertinent information for the benefit of all systems;

- Identify and seek possible responses to the major factors which would significantly contribute toward continued improvement in productivity and performance.

WORK PLAN

The Committee will meet at short intervals initially in order that a comprehensive approach to this initiative may be developed and confirmed, and an expedient start may be made to the undertaking. Thereafter, the Committee will meet at approximately monthly periods to provide direction, support and approval of assignments and tasks it has commissioned. In time, it will revert to a standing Committee function and report on a periodic basis.

The major components of the work plan to be undertaken by the Committee are described as follows.

- Develop and publish a periodic newsletter which will promote maximum communication, interaction and co-operation between the Committee and the various systems, and provide technical and operational information, in order that the objectives and requirements of both the Committee and the individual systems might be mutually realized.

- Develop and publish a set of guidelines which will encourge and assist transit management in initiating and undertaking comprehensive productivity reviews within their individual systems. In the execution of this particular component of the work plan, the Committee will:
  (i) Provide individual properties with assistance as required, in interpreting and applying the guidelines. It should be noted that this assistance will be in the form of explaining the nature, intent, and terminology used in the guidelines document. It is recognized that requests to MTC for financial assistance to undertake further detailed investigations as and when necessary, may be forthcoming.

(ii) Develop a monitoring mechanism to measure the ongoing use and results achieved in the application of the guidelines to ensure continual feedback to improve the quality of the guidelines document as well as identifying industry-wide productivity issues.

- Determine and implement appropriate mechanisms for identifying and communicating to the systems successful productivity and efficiency initiatives and effective management and operational procedures. These will assist transit management in the actual review and assessment of particular activities, and in the identification of possible opportunities for modification and improvement.
- Conduct a review of productivity and efficiency issues and related factors influencing performance in the transit industry, and develop a recommended program for addressing priority concerns deficiencies or trends which commonly confront Ontario's transit systems.

The intended activities of the Committee do not require that a rigid sequential phasing be applied to its investigations. Rather, it would appear appropriate for development to proceed on several fronts in parallel or overlapping time frames. In view of the inter-relationship between the activities, it will be necessary to maintain close co-ordination and direction amongst the various components.The following represents preliminary outlines for the major activities, and a tentative schedule for their implementation.

(1) Develop/Publish Newsletter

Objective: To develop widespread interest and motivation toward pursuing improved productivity and performance across all phases and aspects of Transit administration, and to encourage two-way communication between the Committee and individual transit systems.

Newsletter Outline

Preparation: Determine and take action upon the necessary preliminary groundwork to alert possible recipients of the context and intentions of the newsletter in order to avoid possible adverse and uninformed reaction.

Possible Content: Interest motivators ... Committee activities ... individual system reports ... cost saving initiatives ... articles, interviews ... statistical review challenges ... reproduced news items, helpful technical and operational ideas and techniques etc.

(2) Develop/Publish Guidelines for the Implementation of Individual System Reviews

Objective: To develop a procedural guidelines document which will motivate and assist transit managers with respect to the implementation of comprehensive reviews within their individual systems. The purpose of the guidelines would be to illustrate to transit managers the importance and benefits of undertaking comprehensive system assessments; also to provide a blueprint of the various management and operational responsibilities and activities which should be incorporated and addressed in the review, with accompanying outlines of the pertinent evaluations or considerations which should be applied for each of the respective activities. The desired result is to broaden awareness, perspectives and commitment in order to maximize the effectiveness of the system review initiative.

Guidelines Outline

- Introductory discussion indicating the need and importance of undertaking a comprehensive review, and the benefits to be derived ... intent is to motivate recipient to take positive action within his system.

- Clearly stated rationale why review should:
  - ... have full management commitment and profile;
  - ... have comprehensive context - external linkages - internal procedures - top to bottom activities/responsibilities - subsequent prioritization of specifics;
  - ... include all aspects, phases of system development - strategic/policy, management/administrative, service/planning, operations - examine all perspectives, what, why, how, when, who.
  - ... have intent, approach fully communicated to all affected, involved parties;
  - ... maximize participation, perspectives of staff,
  - ... be part of a continuing management evaluation process rather than an isolated or superficial effort.

- Categorization of system organization and subsidiary activities involved - factors which influence results and relative importance - aspects to be reviewed, questioned, and perspectives to be considered.

- Indication of available assistance - MTC, OUTA, individual properties, etc.

(3) Documentation/Dissemination of Recommended Practices

Objective: To apprise transit managers of recommended or suggested management and operational activities, procedures, initiatives, techniques, etc. which have been applied by other systems, and which have achieved beneficial,productive and effective results. The desire is to increase transit managers' awareness and understanding of optional practices and their possible application to their systems. This, in turn, would permit a more objective and broader perspective to be introduced in the assessment of specific activities and the identification of potential improvements to their current practices.

- Possible Topics:
  - ... Administrative practices;
  - ... Development/Implementation of service standards;
  - ... Maintenance practices, cash handling;
  - ... Revenue sources;
  - ... Council relationships, budget preparations and submission;
  - ... Purchasing and inventory;
  - ... Security and safety;
  - ... Scheduling and resource utilization;
  - ... Dispatching and operations control;
  - ... Equipment, technology;
  - ... etc.

- Dissemination Options
- Newsletter, reports, periodicals, workshops, visits, conferences, etc.

(4) Identify/Address Industry-Wide Productivity Issues

Objective: To specify the issues and related factors most critically related to productivity and efficiency results, and to identify possible opportunities which, if properly pursued and developed, would be of general benefit and application to Ontario's transit systems.

Approach

- Assemble/synthesise information/input and identify major concerns.

- Identify the primary factors influencing productivity and performance at the various levels and phases of system administration.

- Determine the extent to which these factors and trends are being addressed and controlled in the industry.

- Identify possible opportunities for beneficially influencing these factors and their subsequent impacts.

- Prioritize these opportunities and establish a systematic program for further investigation and development of recommended initiatives.

Committe Organization

The Committee will consist of representatives of OUTA and of MTC, and will be administered under a joint-chairmanship arrangement. A Project Manager, who initially will be assigned from the MTC representatives, will be responsible for the overall administration and co-ordination of project activities under the direction of the Committee.

The Committee may, from time to time, expand its membership or establish sub-committees to gain the perspectives of a broader cross-section of transit system types or expertise in particular areas.

The Committee may make recommendation to MTC with regard to the assignment of consultants or other parties to carry out specific tasks, and may request the MTC to participate in the funding of such requirements.

Consultant Participation

In view of the desired expedience associated with this project, and the variance of expertise required to effectively address the several aspects involved in this task, it is anticipated that the undertaking will require multi-consultant assignments. Separate consultants will be utilized to perform specific tasks or activities under the direction of the Committee. However, in instances where more than one consultant is employed for a particular phase or activity, it may be beneficial to designate one consultant as a co-ordinator.

PART TWO

FOREWORD - PART TWO

This is Part Two of the Transit Performance Review Guidelines produced by the Ontario Urban Transit Association and the Ontario Ministry of Transportation and Communications, through their Transit Productivity Committee. The Committee includes representatives of transit management and Ministry staff. Its objective is to assist all Ontario transit systems to maximize the effectiveness and efficiency with which they fulfill their responsibilities to their local communities.

The contents of the Guidelines are given in the index which follows. In summary:

- Part One provides an introduction and background on the purpose of the Guidelines. It also describes the approach and the steps in the performance review process. As such, Part One should be referred to when using Parts Two or Three.

- Part Two deals with performance in general management, administration, strategic decision-making and planning. These activities determine the overall resources in manpower and equipment needed to run a transit system.

- Part Three covers performance in the day-to-day operation of the system that relate to the assignment of operators and vehicles to service on the street and to the maintenance of equipment and plant.

3 GENERAL MANAGEMENT AND ADMINISTRATION

Transit is a service to the community, but it should be run as a business. As with any business, there is a need for both general management and administration. General management addresses the broad issue of coordinating the various activities in a transit property by ensuring communications among them and providing leadership. There is certainly a management component within each activity, and general management should not be viewed as replacing the management of these individual activities which are addressed in the subsequent chapters of the Guidelines. Administration is the variety of activities which support transit, or any other business, on an overall basis. These activities include:

- Financial Management
- Marketing and Public Relations
- Labour Relations
- Personnel Management
- Risk Management/Legal/Contracting
- Information Management.

Thus, this chapter addresses two broad areas which are separate, yet, nevertheless, closely related.

However, the purpose of this chapter, and the others, is not to establish a precise definition of every activity in a transit property but rather to help establish the process that will evaluate them, however they may be grouped. The process should permit you to consider two key issues. The first issue is "WHY", why is this particular activity important to my transit property? To take a different perspective, you may ask what overall effect these activities have on the transit property. For example, how does the creation of an annual budget help me to monitor and manage my week-to-week activities? If you are satisfied that there is a need to perform an activity, you should then address the second key issue. That issue is "HOW", how well do you perform a particular activity? Again, another slant would be to ask if there are ways to improve the performance of a particular activity. For example, how can the budget preparation be improved? If you can address the two key questions of "why" and "how", you will address performance improvement in the area of general management and administration.

What results should you expect to achieve from this self-analysis? Obviously, the Phase One review should point to areas where there are immediate opportunities for performance improvement, as well as areas for further analysis. In addition, the review should produce other results. It should reinforce communications among the various areas within the property, build up the spirit of teamwork among the individuals who are responsible for them, and improve their level of understanding of their part in the overall property. Perhaps the most important result is the establishment of the self-evaluation process itself during Phase One. This process would be used on a continuing basis thereafter.

In order that the guidelines will be useful across a wide range of transit properties, they are general in nature and may not necessarily match the management and administrative structure of your transit property. Activities will have varying degrees of importance among properties, depending on size and organizational differences between them. Accordingly, you should consider how the guidelines can be applied to your property. Some of the guidelines may not apply directly. For example, a small operation with no data processing department may find that the section on information management is not entirely relevant to their current situation, but it may be relevant for future planning. A very large operation may find that information management guidelines could apply to several departments within its organization structure and thus be an important area to consider. Your judgment will be most important in determining the appropriate level of detail for the review of each activity. The evaluation of activities should be prioritized so that those areas with the most potential for improvement receive the primary focus.

Finally, most of the issues in this chapter are quite general, and not specific to transit. As was stated at the outset, transit should be run as a business. The issue is to examine your business, transit, in the context of today's times, to see if it may be possible to improve some of the management and administrative processes that have evolved over time. Transit has many of the same management and administrative requirements that are found in any business. As a result, the same principles apply, and the same questions "WHY" and "HOW" apply whether we are evaluating transit or something quite different.

3.1 GENERAL MANAGEMENT

The primary sub-activities that constitute general management are:

- the definition of the goals and objectives of the organization, particularly as they relate to the kinds of people who will make up the organization and the performance level to be expected of them. Interaction among managers and between the General Manager and policy group as they set goals is important so that the overall interests of the property will be met. The interaction between the General Manager and the policy group is addressed in Chapter 4, Strategic Decision Making.

- the identification of the role of all managers, and particularly the General Manager, in establishing and maintaining communications throughout the organization.

- the identification of the role of all managers, and particularly the General Manager, in delegating work and supervising the performance of that work.

- the maintenance of an organizational structure which adapts to the changing environment and facilitates while striving to reach defined objectives.

- the development of a management "style" or "personality" which extends throughout a manager's department or the organization.

This list is a brief summary of the components of management. There is an extensive list of publications which address this topic. It would be misleading to suggest that these next few pages will provide all of the insight that you would ever require to do a complete, thorough self-analysis of general management. Hopefully, they will be a stimulus for positive thought and a vehicle which helps you strive for performance improvement.

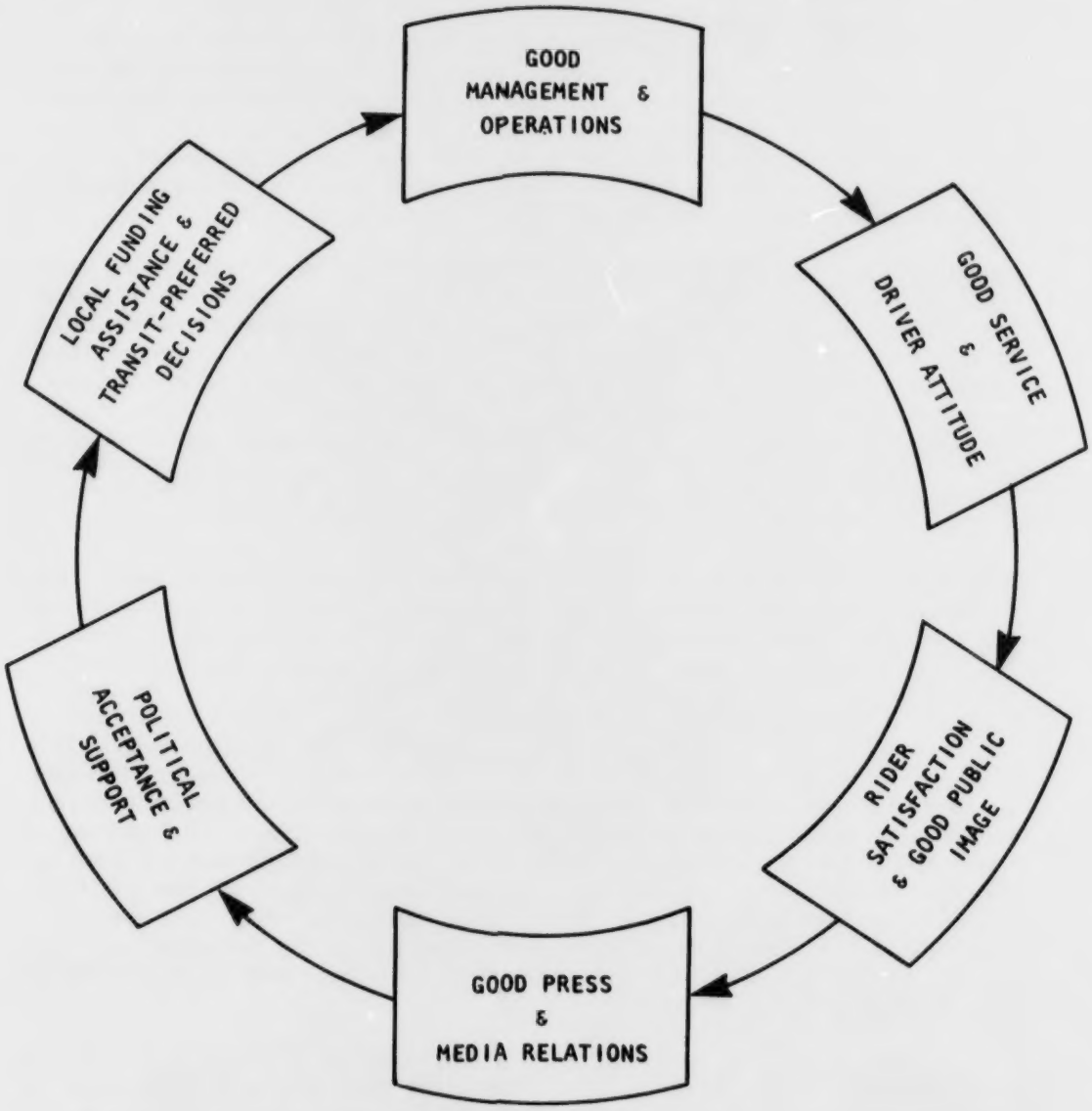
Several factors make the area of management one of the most difficult to evaluate. Much of an organization's impact in this area depends on the personal influence of a few key people. The issue is depicted best by Exhibit 3.1. The figure shows the close interrelationship of activities and how they all fit together to result in a "good" property. There is a direct relationship between the quality of management, their style, and the activities depicted on this figure. It is difficult to be objective in a review of personal influence. As well, the factors and sub-activities in this area are not easily quantified. The management of an organization develops over time and is not changed quickly. It depends on communications, delegation and management style.

Communications - In today's business climate, communications is becoming more and more important. It is extremely important within an organization to ensure that policies and directions are properly transmitted to the people who will be carrying out specific activities. These broad channels of communication constitute a substantial portion of general management. How you communicate, how often, with what media, formally or informally, will significantly impact your management effectiveness and, thus, the overall performance of your transit property. Therefore, it is most important to take a look at how you communicate and how you carry out this important part of the general management function.

Delegation - It is equally important to establish the mechanisms to permit the review and supervision of the activities performed by others. The organizational structure will impact communications both within the property and outside to the Council or Commission members (the policy group) that have overall responsibility for transit. Structure has an important effect on the abilities of managers to delegate and supervise work. It is easier to perform these tasks if you have a clear understanding of who is responsible for specific areas. This issue may be reflected in the accuracy of budgets. While the General Manager has overall responsibility for the property, he probably would delegate budget development to individual departments. However, the General Manager must review the budget setting process; and he must also be involved with the tracking of actual versus budget. There is a fine line between too much and too little involvement from the General Manager on activities such as these. An organization structure that is clearly communicated to the personnel will help prevent duplication of effort and conflicting decisions resulting from several individuals dealing with an issue.

Management Style - Your personal traits and your ability to react to change are also important. There, issues may be reflected in your ability to "sell" ideas to the policy group and to your staff. Occasionally, personalities will get in the way of perfectly good ideas. Those ideas will be rejected, and the overall performance of the property may suffer.

TRANSIT PERFORMANCE LOOP



IF ANY LINK IN THIS LOOP BREAKS DOWN,
EFFECTIVE AND EFFICIENT URBAN TRANSIT MAY NOT BE ATTAINED.

EXHIBIT 3.1

Questioning Performance

Communications, delegation and management style are important since they affect every aspect of system performance. The following questions will assist in evaluating if these areas can be improved.

- How do you communicate and how do you foster good communications in your property? How could you improve these communications areas?

- Delegation of tasks - at what staff level will tasks be done most efficiently and effectively? As a manager, you shouldn't get bogged down in details. You should also consider the motivation effect on your staff when they are allowed to "carry the ball".

- How do managers deal with particular situations to achieve consistency, so that subordinates know what to expect and what is expected of them?

- What is the span of control under the General Manager? If too many people report directly to the GM, too much time may be spent directly supervising. In reviewing the structure, how much impact would inserting another level between the GM and the staff have on the GM's activities?

- As a self-analysis, how much time do you spend in various activities such as: meeting with the policy group; delegation; supervision; staff meetings? How much of this time is productive?

- How might you free up some time to focus on other activities? Some possible ways are: mechanization of repetitive tasks, delegation of the routine portion of a task, e.g., 80 percent, to a less experienced person, with only the exceptions handled by the manager.

- What standard procedures are currently in use? How could procedures be improved so that tasks can be made routine enough to delegate?

- What criteria do you currently use in the hiring process? How can you hire personnel with a conscious consideration of their fit with managerial style? One approach is to recognize your own management style, make any changes that would be appropriate to increase your efficiency and effectiveness as a manager, hire personnel who will work best with that particular style.

- What is the link between accountability and responsibility in the organization structure? How well is this relationship understood by the personnel in your organization?

- What formal lines of communication exist between departments and within departments?

- What informal channels exist and how could the use of these informal channels be improved?

- How do the management personnel in the property keep each other informed to avoid duplication of effort and conflicting decisions?

- How recently was the formal organization structure reviewed? What changes to the structure might be made to meet the demands of the external and internal environment? What are the effects of: - growing operations? - technological changes?

- How often do you and your staff attend management training courses, seminars, and conventions?

- Who approves attendance at such sessions? How is information from these sessions made available to other personnel in your property?

- What techniques are used to present issues to the policy group to ensure the most favourable treatment?

Performance Indicators

Since it is difficult to quantify factors in the area of General Manager, hard number measurements may not be appropriate as key performance indicators. However, you may want to consider such information as:

- the frequency of meetings attended by managers. This is not an absolute measure in the sense that more meetings or fewer meetings will be better. The key issue is the overall value of the meetings for your property.

- the frequency of analysis of organization structure and goals. As an example, you may work with key personnel to set specific objectives or targets for each person for the coming year. You could monitor how well each person performs in meeting his specific objectives.

- turnover of key management personnel.

As a very broad measure, you may refer to Figure 3.1 and attempt to determine how well your property is positioned relative to those factors. A second facet to performance indicators is the trend of your property's performance to determine if you are continuing to improve relative to the factors presented on the chart.

The sources of information which might be used in a review of general management are: the formal policies regarding managerial evaluation and development; the manager's records of activities performed vs planned activities; the formal business plans of the organization.

3.2 FINANCIAL MANAGEMENT

The primary sub-activities within the financial management activity include:

- The implementation of budget policies and procedures throughout all departments and the supervision and assistance of budget development by the departments.

- The operation and supervision of all financial systems, e.g., General Ledger, Accounts Payable, Accounts Receivable, Cost Accounting, Revenue Accounting.

- The operation and supervision of the Payroll system (treated separately because of its close relationship to Personnel systems).

- The implementation and administration of sound accounting principles and controls in all financial areas (audit and control).

- The production of financial and management reporting requirements including: internal responsibility reporting; internal & external financial reporting; and external reporting (e.g., to the Ministry and the policy-making group).

Good financial management is comprised of many sub-activities. This area is important because it allows you, as a transit manager, to understand where you face fiscal constraints, where there may be opportunities to reduce costs and how the actual performance relates to your budget. You must know where the dollars are going and why, and you must be able to communicate that information both down through the organization of the transit property and up to the policy group that oversees the transit operation. This relationship with the policy group is dealt with in more detail in Chapter 4, Strategic Decision Making. In short, you must have a good mechanism for estimating the financial requirements of the transit property and an equally good mechanism to control the actual expenditures. Your review should focus on how the financial area operates and on its impact on the transit property.

The many factors influencing financial management may be grouped into three broad areas: Accounting Procedures; Financial Reporting; and Budgeting.

Accounting Procedures - The existence and maintenance of standard operating procedures to process financial transactions helps you to provide control and accuracy over the recording and reporting of data. Control is important in all areas, but it is particularly important in the cash receipt and disbursement areas. Obviously, you must ensure that receipts are not lost. In addition, careful management of cash, e.g., not disbursing cash until necessary, can have an impact on your cash requirements. Reliability of processing is closely related to control. Reliability is also enhanced by good operating procedures. The result is less effort spent to verify information and correct errors.

Financial Reporting - Reporting is influenced by level of detail. For example, in some properties, the payroll group may provide reports on guarantee time,

overtime, etc. The proper level of detailed information can help operating management make better staffing decisions. Closely related is the timely and accurate preparation of financial and management reports. If information is not timely, it will not be useful. Not only have you not had the benefit of the information, but also you have spent time and effort to produce the wasted data. Mechanization, including computerization, may help both the timeliness and accuracy of the information. It could also relieve a significant processing burden from clerical personnel.

Budgeting - Budgeting is impacted by the processes used to complete the budget. Typically, the finance department would organize and/or supervise the activity; but the various operating areas would actually prepare their own budgets. This approach helps in several ways. It opens up lines of communication so that budget issues in specific areas may be examined in light of overall budget constraints. It also helps obtain the commitment of operating personnel to their own budget. Budget Forecasting is discussed further in Chapter 4.

Questioning Performance

Typical questions that will assist you in assessing the performance of financial management follow.

- What are your accounting procedures?
- How recently have the accounting procedures been updated?
- What opportunities exist to automate procedures, e.g., word processing?
- What opportunity to update procedures do people that perform the work have?
- How well do the current controls reduce the risk of errors/fraud? What audit recommendations have been implemented?
- What activities are performed by internal/external auditors?
- How do you assess the value of this audit work?
- What financial and management reports do you currently provide to operating areas? Why are they provided? Who uses them? What if certain reports were discontinued? What if others were added? Would these result in improvements or savings elsewhere?
- What level of detail is appropriate for reports? Where would summary reports be adequate?
- How critical are the reports in decision making? How could improvements such as more timely reports or the use of summary information make the information more useful to management?

- What effect would centralizing/decentralizing report preparation have on efficiency or effectiveness?

- What effect would automation have on the staff levels required to produce financial information?

- How are the goals and objectives of the budget process stated?

- What procedures and policies exist for developing departmental budgets? Do these policies include:

  - A methodology for preparing the budget.
  - Working cost and revenue assumptions.
  - Documented sources of information.
  - Involvement of staff and management in the budgeting process.
  - The use of techniques that require a complete re-thinking of the budget rather than a percentage increase over the previous year.

Performance Indicators

There are a variety of performance indicators that may be used in the financial area. The Revenue/Cost ratio is one of the most widely accepted as providing a snapshot of the health of a property. The trend in this ratio can be easily charted over a period of time. In order to examine a potential problem in more detail, you should turn to variance analysis to get an indication as to the source of a problem. These indicators are useful in describing the overall financial performance of your property. Some of the indicators that follow also would be useful in determining how well the financial management processes are carried out.

Accounting Procedures:

- Errors and delays. Identify those which occur because of confusion or lack of training.

- The number and value of unreconcilable accounting entries as a portion of all entries. This might indicate procedural problems.

- The supervisor/staff ratio. Lack of procedures results in high supervision level.

- Backlogs, overtime and/or use of temporary help might indicate poor planning and/or poor assignment of workload.

Usefulness and Accuracy of Reports:

- Budget variances. Identify the portion attributable to performance and the portion resulting from poor budgeting.

- Timeliness of report preparation and distribution. Percent of all distributed reports received late.

- Accuracy of data presented on reports, i.e., error rate.

- Number of special report requests received. Large, or growing numbers of requests may indicate a need to review the existing reporting structure.

- Number of reports reformatted after initial preparation. This indicates reports are not meeting management requirements.

The information sources for these performance indicators may be obtained from existing incident reports, accounting policies, procedure manuals, financial and management reports. Requirements for change may be identified from audit recommendations regarding procedures and controls, also from requests by management staff for report or procedure modifications.

3.3 MARKETING AND PUBLIC RELATIONS

Maintaining and increasing ridership is essential to the long term viability of transit. While there are many factors that affect ridership, a good marketing and public relations effort can do several things. It can help handle problems and thus, let the ridership know that the transit property is, in fact, concerned with their overall satisfaction. It can also let the community, in general, know about the high quality of transit service that is provided. This information would be useful not only for riders and potential riders but also for the policy bodies that would be involved in funding decisions. When analyzing this area, you may examine how the marketing and public relations activity operates today in light of the overall effect that this activity will have on the transit property.

The primary sub-activities within the public relations function include:

o The design and implementation of an effective marketing strategy. This would include: an advertising campaign directed at the potential market for the transit property; co-ordinating a marketing strategy with other regional operators such as inter-city bus services, train services, commuter services.

o The administration of the customer relations activity. This area would include: handling complaints; providing and distributing public information.

Marketing - The effectiveness of the marketing plan depends on how well the plan recognizes all the variables that may affect it, in terms of the nature of the market to be served and how to attract passengers by improving service. Some market research techniques that complement the marketing task are discussed in Chapter 5, Planning.

In addition to these external factors, the marketing plan must be integrated across the transit property. The promises made by the marketing activities must be able to be satisfied in an efficient manner by the operating department. For example, if advertising is urging the public to use transit to get to and from a special event, then you must be able to provide the service - and provide it efficiently. Thus, all management personnel should have input into marketing objectives; and marketing personnel must be familiar with those objectives when they formulate the marketing plan.

Public Relations - Public relations is affected by the resources devoted to handling complaints and the emphasis placed on customer satisfaction by the General Manager. If you are committed to quality customer service, you will devote resources to providing good service and to handling the complaints that do occur. These should in turn reduce the rate of complaints. In addition, there must be proper training of the personnel that deal with the public. They are your first line of contact and, as such, are in a position to resolve issues before they become complaints.

Another important aspect of public relations is to ensure that the public are fully informed on the service provided. Route maps, schedules and information on fares should be readily available at convenient locations and advertised at regular intervals in the media when changes take place.

Questioning Performance

The effectiveness of marketing and public relations has a major impact on ridership and how well the transit service is perceived by the public. The self-analysis review should question:

- How is the marketing plan developed? How do the various organizational groups, e.g., service planning and operations, participate in the planning process?
- How well is the marketing planning integrated with the marketing plan(s) of other transit properties or other local services (if applicable)?
- How has a target market ('Transit Rider') been identified?
- Who is responsible for monitoring the plan, and how is this monitoring done?
- How is advertising handled? What is its effect on your property overall? What would happen if you stopped spending for advertising?

- How could you "turn the tables" on advertising, e.g., get other groups to sponsor promotional events and do your advertising for you?

- What impact does your Customer Relations activity have?

- How are compliments/complaints analyzed and acted upon? How do you cross-reference complaints to ensure that a complaint reported by a driver and by a rider is not double-counted?

- What follow-up is performed on customer complaints?

- What action, if any, could improve information on the service provided and reduce the number of customer inquiries, e.g., better information on vehicles, better advertising, on-site service representatives?

- How are supervisors, drivers and clerks who come in contact with the public, made aware of service and marketing objectives? What training is provided to enable them to answer related questions?

Performance Indicators

The marketing cost per passenger and the number of passenger complaints are two indicators that should be significant in helping to determine if there are performance improvement opportunities in this area. These and other indicators would use historical data to show the trend. Other indicators that may be useful are:

- Marketing Cost per Passenger

- Ratio of Marketing Cost to Total Operating Cost

- Number of Passenger Complaints

- Number of Passenger Commendations

- Complaints compared to Commendations

- Number of Information Inquiries

- Increase in Ridership, overall and on specifically advertised services

These indicators may be developed from ridership statistics, the marketing budget, surveys and market analysis, service planning documentation, records of customer complaints and comments.

3.4 LABOUR RELATIONS

The primary sub-activities within the labour relations function include:

- Negotiation of the labour contract
- Maintenance of employee grievance procedures and records
- Compliance with contract requirements
- Facilitating union/management interaction.

The labour dollar constitutes a very large percentage of a transit property's operating budget. That alone should make it worthy of careful examination. In addition, the tough economic times of the 1980's has placed greater emphasis on labour-management relations. In some cases, this has resulted in more confrontation between labour and management as exemplified by the controversy surrounding wage restraints for government and industry employees across Canada. This type of confrontation does not enhance the performance of any industry. Therefore, it is very important to examine the entire spectrum of activities that relate to labour, including both labour relations and personnel management. You need to examine how you carry out activities in those areas and how you might do it better in the future to enhance the overall performance of your property.

Collective Agreements- Obviously, wage agreements will have a direct and significant impact on financial performance. In addition, other items such as spread time and various work rules can have just as large a dollar impact. For example, various contract work rules may affect the flexibility that the property has in assigning personnel. This can result in less efficiency in the use of personnel and/or the use of additional personnel, as described in Chapters 6 and 7 which deal with transportation and maintenance operations.

Grievance Procedures and Contract Compliance - The existence of standard operating procedures and maintenance of adequate records can help with the administration of this area. For example, formal grievance and negotiation procedures will probably be outlined in your contract; but, by standardizing the use of the procedures, grievance handling and negotiation can be run more smoothly. Standard procedures will also serve to ensure contract compliance and will provide formal documentation of actions taken regarding any grievance or during negotiations.

Communications - An appropriate organizational structure should provide for sufficient interaction between the union and management. Good communications before actual negotiation can reduce the likelihood of a strike or an unsuitable settlement, and they can help ensure that the bargaining table is not cluttered with insignificant issues. Communication channels can be defined to a great degree by a formal organization structure, thus ensuring a higher level of union/management interaction. The establishment of the organization structure must also provide for receipt of information on potential problem areas through informal channels.

Questioning Performance

Your ability to anticipate and plan for union demands will directly affect your success at the bargaining table and will lead to the development of better union/management relations. Labour planning could involve building scenarios of and projecting the costs of anticipated union positions. You should be aware of the effects on the total cost structure of changes to work rules, benefits, and hourly rates. You should involve all functional areas of the property in the labour planning process and question how effective it is. Typical questions are:

- What is the current state of the contract? How do new work rules, as an example, impact overall performance? How has the contract changed from the previous version? Was this under management control? If the contract has had numerous amendments included over the years, are the various clauses consistent?

- What policies exist regarding the long term expectations for negotiation and contract development?

- What formal procedures are in existence regarding grievances? What documentation exists to support the procedures? How do you ensure that procedures are followed closely enough to guarantee proof of action in a grievance case?

- How are contract negotiations handled? Who participates? How do the various functional areas in the property impact this process? What planning activities are conducted?

- What are the formal and informal communication channels between union and management? How well do these channels operate?

- Where do you stand relative to the rest of the industry, the rest of the community? The perception is as important as the reality, e.g., if labour believes they are "falling behind", they may be more inclined to take a tougher position.

- What is the overall economic condition of your property? community? province?

- How will your actions affect you in the short- and long-term? What precedents or trends will you be setting (items that may be desirable today may have an adverse impact tomorrow)?

- What information is available to you to permit good labour management?

- Do procedures and communications support each employee's role and do they foster a sense of commitment and pride in their work?

Performance Indicators

Absentee hours/total hours by class and turnover by class are two key indicators. Again, trends rather than absolute numbers are the significant items. In the area of labour, as much as anywhere, good information is important to be able to do a good job. For example, you must be able to recognize that an individual has had an absentee problem before you can start a program to address the problem. This recognition depends on proper information. Enough detail and history is required to provide an accurate picture. Other indicators may also be useful:

- Absentee or strike hours by employee class/total hours by class
- Employee complaints by employee class/total employee complaints
- Contract negotiation rate
- Driver cost/operating hour
- Driver cost/revenue hour
- Operating hour/revenue hour
- Disciplinary action rate by employee class/total
- Turnover by employee class
- Employee complaints by employee class

Information sources to assist in developing these indicators are the labour contract, grievance procedures and records, personnel records, negotiations procedures and records.

3.5 PERSONNEL MANAGEMENT

The primary sub-activities within personnel management include:

- o Recruiting and selecting personnel.
- o Evaluating employee performance formally and informally and relating evaluations to productivity and compensation.
- o Administration of disciplinary actions, including dismissal.
- o Setting salary and benefit policies after analysis of salary levels and fringe benefits by employee class.
- o Administration of benefits, deductions and claims.
- o Developing and administering employee training programs.

- Administration of career progression planning and definition of its relationship to training and compensation.

Recruitment - The existence and maintenance of standard personnel recruitment procedures can influence all areas of personnel management. Standard methods for recruiting and selecting personnel help provide a consistent level of quality. The various operating departments should participate in the establishment of these criteria.

Performance Evaluation and Compensation - The existence of a formal system of evaluation with a well-defined basis for measurement of performance is important. This process forms part of the basis for salary increases and promotions. A process for establishing and maintaining up-to-date job descriptions and setting appropriate salary scales and benefits complements the evaluation process.

Maintenance of adequate records to track personnel data is important. Management needs information on status of personnel data and costs. However, the procedures and information that support disciplinary actions are critical. In today's climate, virtually all organizations may be subject to legal action as a result of a dismissal. Personnel Management must be prepared to support such action by being able to show that progressive disciplinary actions were taken, attempts were made to help the individual correct the problem and that the individual actually is detrimental to the property.

Training - Procedures to ensure consistency and relevance of training programs and to ensure that all employees have the opportunity to improve their performance and advance in the organization are also important. The proper level and experience of staff in Personnel Management will affect performance. Staff should have adequate supervision, training and/or experience in this area.

Questioning Performance

The following questions will assist in the review of personnel management activities:

- How is the recruiting process initiated?
- Who participates in the recruiting process and to what extent? Who makes the final decision on job offers?
- How satisfactory is the recruiting effort, e.g., what is the turnover?
- How does the formal evaluation process work? Who conducts reviews? How often are they done? What is the feedback/follow-up process? How do reviews impact salary/promotion? How do employees perceive this impact?
- What informal evaluation system exists to give feedback to employees regarding their performance?

- What effect does the evaluation process have on your staff?
- What training do supervisors receive to evaluate staff and give appropriate feedback?
- What training programs are in effect? Who are they aimed at? What are their objectives? Who administers and conducts them?
- How much employee time is dedicated to training? Should this be reduced or increased? How may improved operating procedures reduce the training effort?
- How effective is the training? How do you measure its effectiveness?
- How many employees suggest or make procedural improvements which relate to their own job?
- How is compensation administration executed? Who participates? How do other departments impact the process? What information is used to monitor progress?
- How can automation assist with sub-activities in the personnel management area? What is currently automated? What plans exist for additional automation of personnel records?
- How are disciplinary actions handled? What records are kept? What is done to avoid repeat incidents? What follow-up is done?
- How is excellent performance recognized? How is this documented? What feedback process exists? What follow-up is done?

Performance Indicators

The following indicators will assist in evaluating the personnel management area:

- Average training hours/employee by employee class.
- Percentage of employees overdue for performance evaluation.
- Cost of benefits administration.
- Percentage of unfilled positions.
- Average duration of vacancies.
- Turnover rate.
- Percentage of promotions from within.

The information that will be of assistance in the review process includes: documentation on personnel recruitment and administrative procedures; employee job description and evaluation forms; training plans and training records; personnel inventory and salary records; financial reports, detailing salary and benefits information.

3.6 RISK MANAGEMENT/LEGAL/CONTRACTING

The primary sub-activities within the risk management/legal/contracting function include:

- The administration of the insurance program.
- The administration, management, and evaluation of contracts.
- All other legal activities.

Risk Management - Risk management is affected by the size of the property, the claims history, and the trends in this area. It will also be affected by the procedures established to obtain insurance and to handle claims. For example, the property may self-insure or combine its insurance needs with the city's. As another alternative, all insurance and claims may be handled by a third party. There are many options and many different cost implications.

Contracting - Contracting will be affected by the nature and amount of this type of activity. For example, if a large amount of maintenance work is contracted out, there should be good procedures to monitor this activity. Again, there are many alternatives to awarding contracts. There is also a need to monitor the performance of individual contracts.

Questioning Performance

The following questions will assist in reviewing this area of administration:

- Who manages the insurance program? How could outside assistance be used to help administer this program?
- What is the economic performance of the insurance program? How do premiums and commissions compare to claims and deductibles? How do the costs of marketing risks compare to self insurance? What, if any, areas may be excluded from coverage?
- What areas of the business are most risky? How can the risk be controlled? What is the largest possible claim and probability?
- How can risks be reduced by better employee training and safety programs?

- What areas of activity are currently sub-contracted to outside suppliers?
- How do you determine whether you should move toward more or less contracting?
- What are the economics of bringing existing contracts in-house, sub-contracting current in-house activities?
- Who handles contract administration?
- How are contracts awarded: by tender or by negotiation? What is most appropriate?

Performance Indicators

The following indicators will assist in reviewing the performance of risk management and supplier contract management.

- Kilometres between accidents.
- Insurance cost/revenue km.
- Insurance cost/hour.
- Insurance cost/total cost.
- Average claim settlements.
- Lost time due to employee injuries per employee hours or per vehicle kilometres.
- Claims/vehicle.
- Claims/operator.
- Contract cost/total operating cost.
- Contract cost trends.

These indicators can be assembled using information from various sources. In the area of claims these include: accident statistics and reports; reports on outstanding claims and claims cost; and workmen's compensation claim reports. Information on the effectiveness of contract management may be obtained from annual budget and financial reports, contract billings and financial reports of overruns.

3.7 INFORMATION MANAGEMENT

Information management addresses a wide variety of information needs. However, in this chapter, the information requirements of various areas are covered in the sections that pertain to those areas; and this section deals primarily with data processing activities. This should be an area for review even where there is a current lack of data processing. With the continuing decline in the cost of computers, the benefits of data processing will soon be within the reach of most properties. Those who do not use data processing methods may view this section as preparation for the not-too-distant future.

The primary sub-activities of Information Management are:

- Information systems planning and policy development
- Development of new systems
- Operation and maintenance of current systems
- Technical support
- On-going liaison with systems users

Standard procedures include a methodology for the development, implementation and support of information management systems. Such a methodology is important to the success of information management because it will assist management to maintain and enhance systems. In a related area, the knowledge level of staff will affect the quality of work. Selective hiring and the provision of in-house training will improve their performance.

The formal structure should provide for communication between users and the information management department. Users should participate actively in designing the information system to ensure that it meets their needs. Informal communication channels are also important to help the information management department deliver the correct service.

Questioning Performance

The questions that will assist in reviewing the effectiveness of the management information system follow.

- How well does the data processing department serve user needs? How many requests do users submit? How are new requirements anticipated and planned for?
- What formal or informal channels exist to ensure that users participate in the systems development process?

- What development aids are being used? Software tools? Development methodologies? Outside services? Software packages?
- How are new systems justified on a cost-benefit basis?
- How timely is the development of new systems and the operation of existing systems?
- What training is available for data processing personnel?
- How old are existing hardware and software systems? How will replacement schedules impact the budget?
- How does the data processing activity report to management?

Performance Indicators

While there are a variety of key indicators, the actual cost of the information system versus the budget and the growth of the budget point to the amount of your resources devoted to data processing. You should expect that as you spend more in this area, you will get more positive feedback from your users. You might also be able to identify benefits that result in other areas of the property. Performance indicators include:

- Feedback from management and users regarding systems
- Cost allocations to user departments
- Average technical training hours/employee
- Average output per programmer
- Hardware resource utilization/hardware capacity
- Age of hardware
- Age of application systems
- Number of modifications/corrections per month to systems in operation
- Actual performance vs. schedule
- Data processing actual costs vs. budget

Sources to assist in obtaining the above include: formal data processing policies; audit recommendations; systems development methodologies and plans; training plans and manpower plans; user requests and trouble reports; project status reports; employee time reports.

3.8 SUMMARY

The review procedure should follow the general outline presented in Chapter 2, of Part One. The primary objective is to initiate the process, to take a hard look at yourself to determine where there is opportunity for performance improvement in the areas of general management and administration. You will have to ask "WHY" you do things; that is, what effect do they have, are they needed? If they are needed, you will have to examine whether the various processes can be improved. Often, it's easier to go the other way - to determine what the process is and then, virtually automatically, to determine the ultimate value of the process.

There are many performance indicators listed on the preceding pages and in the subsequent chapters of the Guidelines. That should not suggest that they should all be used. They are examples of data that may be helpful to indicate performance. In fact, if you were to use all the indicators, you would probably be spending far too much time on a particular part of the analysis.

The area of general management will be the most difficult to review because the issues are very subjective. In most cases, they deal with quality of communications, not quantifiable measures like cost per kilometre. Nevertheless, you should document the results of your review. That documentation would indicate whether this area can be modified to improve the overall performance of your property whether the area should be subject to further review. The key issue is communication; how to ensure that ideas are properly transmitted, how to encourage and motivate staff, in short, how to get the most out of your personnel.

All of the other review areas should also be documented. The review report should contain the findings of the self-analysis and recommendations for any further analysis or for any procedural changes. Each section would list positive findings and comments as well as identifying areas for further study or specific improvement. Recommended changes should be described at a level of detail which will be useful for implementation. An important aspect of the report would be to identify those activities with the highest priority. Since not all changes can be made at one time, it is critical that those recommendations which will have the largest positive effect and can be readily implemented are tackled first.

And finally, there are many facets to the activities that comprise general management and administration. Communication is very important to the overall success of a transit property. Attention to financial management issues such as budget preparation and variance analysis and to labour items such as negotiation and grievance handling is very important to the administrative area. These activities can have a significant impact on the overall performance of a transit property. You should examine these activities to better understand why they are important and how you might perform them better.

4 STRATEGIC DECISION-MAKING

Strategic decision-making is planning ahead. This is accomplished through setting goals and priorities, evaluating and making decisions concerning service levels and budgets, and determining the resources that will be allocated to the transit system. As such, the strategic decision-making process has a significant impact on the performance of the transit system and the way that things are done by the transit organization.

Strategic decisions are made by a policy group on the advice of transit management. The policy group, which can be an elected Council, Commission or a Committee or Commission appointed by Council, is responsible to the public. Transit management, on the other hand, is responsible to the policy group and, consequently, the policy group's decisions form the framework within which transit management must carry out its responsibilities. Therefore, transit managers have a key role in keeping the policy group fully informed of the various factors that influence system performance so that its decisions can be made in an informed way. This means having frequent and close communications between transit management and the policy group so that there is an understanding of the expectations on both sides. It means providing background information which not only recognizes these expectations but also the capabilities of the people within the transit organization. And importantly, this means recommending and setting service standards, policies, and budgets as the basis for maintaining an efficient and effective transit service.

This chapter covers the activities which assist transit management and the policy group in strategic decision-making. These include:

- Strategic Planning;
- Service Standards and Policies;
- Revenue Policies;
- Resource Policies;
- Budget Forecasting.

The following sections provide guidelines to enable management to review and evaluate performance in these important activities.

4.1 STRATEGIC PLANNING

Transit management is regularly faced with the need to respond to requests for service changes from the public and the policy group. In formulating its response, transit management has to have a "strategy" or overall plan against which these proposals can be evaluated by management and the policy group. While strategic planning is not new, as all transit organizations practice it in one form or another, what is new is the approach which must be taken to strategic

planning in times of slow economic growth and rapid technological change. In this atmosphere, good strategic planning is essential to achieve a high level of performance and public acceptability of the transit system.

Good strategic planning is a continuous process of discussion between transit management and the policy group to reach an understanding of the factors which influence the performance of the transit system. It questions where we have come from, where we are today, and where we should be going in relation to the expectations and concerns of both sides. While transit management and the policy group may not always agree on what decision should be made, at least the decisions will be made in an informed way.

The strategic planning activity of management provides the background information on which the policy group makes decisions on its service, revenue and resource policies. While the background information will vary considerably depending on the size of the transit property, or the detail desired, generally transit management provides information which shows the present position and future prospects for the transit system in the context of current and future trends in social and economic development. This is used to determine how performance might be improved if present policies are changed. Important background information for this purpose are indicators which show the trends in transit ridership, revenues, service levels, costs and tax burden. Equally important as background are the indicators which show the trends in municipal demographics, assessment, and budgets so as to put the transit service in perspective with the other services provided in the community.

Graphic examples of this information for groups of Ontario transit properties are given at the end of this Chapter.

What is important is to be aware of the trends which may be occurring for each indicator in your community. The relationship of one indicator to another will help identify the factors which have influenced the performance of the transit system in the past and the factors which are expected to influence the performance of the transit system in the future. Simply stated, these interrelationships provide a good indication of future threats and future opportunities.

Accordingly, when developing strategic plans, the following influencing factors should be considered using the best information available.

<u>The External Environment</u> - in terms of national and regional social and economic trends, population shifts and aging trends; in terms of employment opportunities and government industrial/technological strategies; in terms of trends in energy cost and automobile use; and trends in all levels of government policy with respect to economic development, technological development, and transit financing. An awareness of these external influences will colour how optimistic or cautious to be in setting longer term goals.

<u>The Local Environment</u> - in terms of the particular aspects of the local municipality which may differ from the above over the short and longer range future. These include the trends in: local population (including distribution by

age groups) and employment; land use development; municipal assessment and financial capability; trends in wages and retail trade. These are specific to each community and as such will govern the direction to take in planning for needs beyond the short term.

The Local Travel Needs - in terms of automobile use and road needs, the basic mobility needs and priorities of special interest groups, the relationship between land use development and the transportation system, the role of the transit system in meeting these needs, specific objectives for achieving this role by the transit organization. These determine what the transit system is expected to do in meeting the overall transportation needs in the community.

The Local Transit Needs - in terms of the trends in ridership and service levels, the serving of new development, the costs needed to accommodate the trends and the growth in service, and the fare structures and rates which are needed to keep the financial performance within the capability of the municipality. These establish what resources have to be provided to fulfill the specific transit needs in the community.

These four groups of factors determine the position and future prospects for the community as a whole, and from this the position and future prospects for the transit system within the community. A knowledge of these influencing factors is essential if there are to be informed decisions by the policy group and in particular those related to the service, financial, and resource policies which management requires to operate efficient and effective services. Chapter 5, Planning, deals with service planning, operations planning and market research, all of which provide feedback and background information to assist in strategic planning.

Questioning Performance

The indicators of strategic planning performance are those which are related to the ability of transit management to keep the policy group informed. This can be determined by assessing the answers to the following questions.

- To what extent does the Official Plan establish realistic prospects for the transit system? The Official Plan should be the source of much of the environmental and travel-related information on which strategic decisions are made.

- To what extent is transit management given the opportunity to take the initiative in informing the policy group of strategic issues? In some municipalities, transit management is only expected to respond to requests which come down the line from the policy group.

- To what extent is the political climate conducive to change and to supporting management when changes are made? To what extent is there a strong commitment by the policy group to maintain or improve the position of the transit system consistent with the overall prospects for the municipality?

- To what extent are there clear on-going lines of communication between the policy group and transit management? To what extent is there a regular forum for sharing and debating divergent views? To what extent does management have the opportunity to discuss the strategic significance of individual decisions with the policy group before changes are made?

Strategic planning is thinking about and being prepared for the future. Thus it is applicable to all transit properties, irrespective of the type of transit organization or its size. It is equally important to the small and large transit property. The only difference being that a separate group within the transit organization may do the strategic planning for larger properties, whereas the Transit Manager may do the strategic planning in the smaller properties.

4.2 SERVICE STANDARDS AND POLICIES

A key strategic activity of transit management is the formulation of overall transit service standards and policies for the transit system. Service standards are used to plan the route structures and headways for the transit services. Service policies, which are derived from the standards, establish the broad parameters of the services from the social and political perspective and as such are approved by the policy group.

Service standards cover the parameters of the service as an aid to policy formulation and service planning. Examples of parameters include:

- service area
- minimum and maximum loadings per vehicle;
- maximum headways;
- average passenger walking and waiting times;
- average boardings per vehicle hour;
- weekday and weekend hours of service;
- frequency of transferring;
- average operating speeds;
- on-time performance;
- bus stop utilization and spacing;
- average route spacing;
- warrants for service extensions.

Service policy formulation involves determining which of the above standards need to be adopted as a matter of policy by the policy group and which of the above standards need to be used only as a guide by the planner. The decision is based on the extent to which the policy group wishes to give transit management the flexibility to provide efficient and effective transit services. For example, service standards are intended to guide the planner in tailoring route structures and headways efficiently to the demand and operating conditions. However, the policy group may wish to have the opportunity to introduce a new route or type of equipment for strategic rather than demand reasons, such as to encourage development, create jobs, or meet an obligation to senior citizens. In this case, the adoption of certain service standards may limit this flexibility because the loading or revenue standards may not be attainable.

Questioning Performance

In reviewing service policies and standards, these should be examined to confirm that they are appropriate to current conditions and to identify any areas where they might be changed to improve performance. Questions to assist in this regard follow.

- What are the service obligations as set by legislation and/or by-law, as defined in policy statements, and as reflected by the political philosophy of the policy group? To what extent are these realistic considering changing market and economic conditions and any likely funding constraints?

- How are the overall service and ridership targets established by management and the policy group for the transit organization? To what extent are these levels attainable considering the nature of the transit system and the service area's environmental and operating conditions? What is the impact of social, developmental, and industrial strategies on the performance of the transit system? Are service levels in fact effective in supporting these strategies?

- What is the role of the policy group versus transit management in the development and application of service policy? To what extent are the policies broad enough to be useful over extended periods, and to give transit management the flexibility to adjust to operating procedures and services to keep within established budgets? To what extent does the policy group keep within established budgets? To what extent does the policy group become involved in day-to-day operations? There should be minimum involvement otherwise management's responsibility, credibility and accountability will be diminished.

- How is performance reviewed? To what extent does transit management routinely review the overall performance of the transit services against established service standards? Are there established service standards, and if not how is the overall performance assessed? What actions are taken if performance falls below expectations? Are service standards or policies changed or are the routes restructured?

- How are policies and standards used in the decision-making process? To what extent are service decisions made on an ad-hoc versus a systematic basis by which the service and cost impacts are logically considered? How does transit management work with other city departments and the policy group in setting the priority for transit services, and in allocating funds between transit and other community services?

Performance Indicators

In reviewing service policies, strategic performance indicators should be chosen such that interrelationships between service levels, ridership levels (effectiveness) and cost (efficiency) can be questioned. Accordingly, each indicator has to be expressed on the basis of a unit which is representative of the service area, such as per capita, which is the most common unit and is the simplest to measure.

For this review, the following strategic indicators are suggested.

- Ridership Level - the single most important indicator of service effectiveness is ridership level, as expressed by annual revenue passengers per capita. This indicator is important because the goal of transit is to serve passengers.

- Service Level - a reasonably representative indicator of service levels is annual total kilometres per capita. While annual revenue hours per capita could also be used, this indicator is influenced by the operating speeds and therefore is not a true indicator of the service offered the public.

- Tax Burden - a good overall indicator of service efficiency is the net cost to local taxpayers which is expressed as the net deficit per capita. Net deficit is total operating cost less revenues from all sources including MTC subsidies. In addition to this operating cost indicator, a capital cost indicator might be used, such as net capital expenditures per capita, to show the trend in capital expenditures.

Ridership and Service Levels - Ridership levels generally vary by size of property. Small transit systems, serving populations under 100,000 people, tend to have ridership levels of under 50 annual revenue passengers per capita depending on the service level. This usually indicates that the urban transit system is serving primarily captive riders who have no other choice of mode. Medium transit systems, serving populations of 100,000 to 1,000,000 people, tend to have ridership levels between 50 and 100 annual revenue passengers per capita depending on the service level. This usually indicates that the urban transit system is serving both captive and non-captive riders. Large transit systems serving populations over 1,000,000 people, tend to have ridership levels over 100 annual revenue passengers per capita and this usually indicates that many of the of riders on the urban transit system are non-captive and are using the system by choice.

There are instances, however, where ridership levels do not follow this pattern because the transit system is limited to a particular type of service; for example, feeder services to the line haul services of another carrier. A low ridership level therefore is not always indicative of poor service performance. On the other hand, there is a direct relationship between service levels and ridership levels. As shown in Exhibit 4.1, if there is no change in fares, ridership levels will usually increase if service levels are increased but at a diminishing rate. Thus it is possible to evaluate the effectiveness of the service policies by comparing the actual service level to that experienced in the past, or to that normally experienced by other properties with the same ridership level. If there is a significant difference, then the policy group may have set its service levels too high relative to the demand, or there may be some other factor (such as the nature of the service area) which has limited the market.

Tax Burden - There is a direct relationship between service levels and tax burden. Below a per capita ridership of about 40, net deficits are about $5-$10 per capita (1982 dollars), which is indicative of small transit systems or systems with low service levels. Between a per capita ridership of 40 and 60, net deficits range from about $10-$15 per capita depending on the service level which is indicative of medium transit systems. Above a per capita ridership of 60, deficits range up to $25 per capita which is indicative of large transit systems. The larger deficits are caused by the fact that increased service levels, in many cases, attract new riders who use the service during peak periods when they are at capacity.

Using comparative information of this nature, it is possible to evaluate the efficiency of the service policies. This compares the actual deficit per capita to that experienced in the past adjusted to reflect inflation, or to that experienced by other properties with the same ridership level and service level. If there is a significant difference, then the policy group's pricing policies or the transit organization's fiscal and resource policies may not be appropriate, or there may be some other factor such as operating inefficiencies which has increased the costs.

It should be noted that a high net deficit per capita, if there is a corresponding high ridership level, does not necessarily imply poor performance. The goal of the policy group may be to attract as many riders as possible to the transit service as a means to reduce traffic congestion and offset more costly road improvements. On the other hand, if there is no such goal, then a high deficit per capita should be questioned to determine if there are less costly alternatives for moving people or if revenues can be increased.

4.3 REVENUE POLICIES

An important strategic activity of transit management is the formulation of revenue policies for the transit services including fare structures and rates of fare, also revenue policies for other services such as charters and advertising. This activity provides the pricing framework for the financial management activity of the administrative function as described in Chapter 3.

1981 SERVICE LEVELS FOR CANADIAN URBAN TRANSIT SYSTEM MARKETS OF VARIOUS SIZES

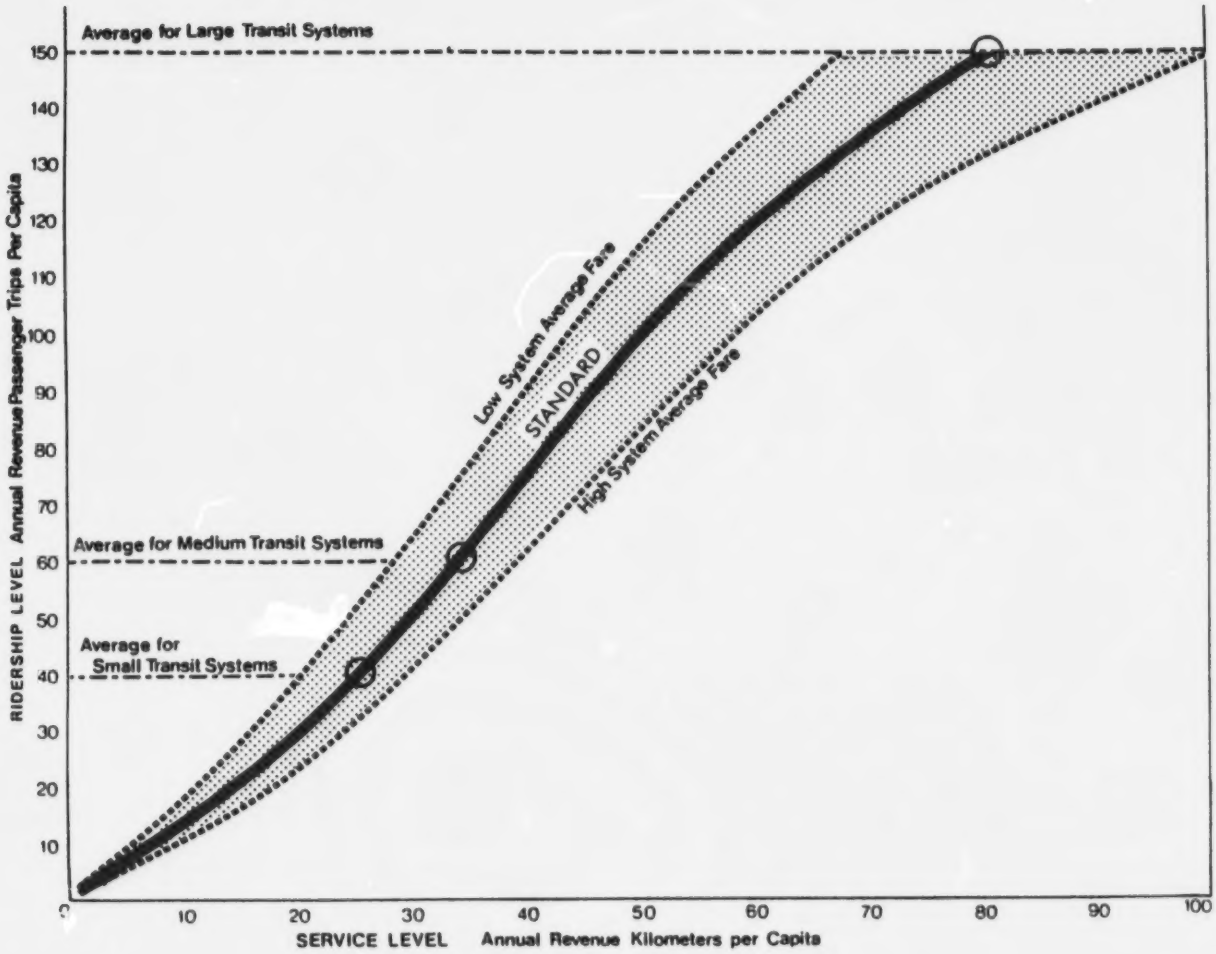


EXHIBIT 4.1

Revenue policy formulation involves determining the share of operating costs which should be taken from the farebox, from other sources, and from the general revenue of the municipality, including the share which should be assumed by other municipal departments and, if applicable, by other municipalities and governments within the transit service area. With this information, transit management proposes fare structures and rates for the approval of the policy group, including various concession fares and pass rates to satisfy its social objectives.

Questioning Performance

In reviewing this activity, the following questions will assist in confirming if revenue policies are appropriate to meet current conditions and in identifying any areas where they should be changed so that performance can be improved.

- What are the revenue obligations as set by by-law, as defined in past policy statements, and as reflected by the political philosophy of the policy group? To what extent are transit services expected to break-even within agreed cost-sharing arrangements? To what extent is the transit organization expected to assume the cost of discounted fares for special user groups such as senior citizens or is this the responsibility of another department?

- What are the overall revenue levels which the policy group has established for the transit organization? To what extent are these levels attainable considering the nature of the transit system and the service area's environmental and operating conditions? Do they simply reflect an escalation factor over last year's revenue budget or do they take into account the value of the product and price elasticities? To what extent are the fares charged special user groups reviewed to confirm that their supporting agencies are paying their fair share of costs. To what extent are monthly passes priced according to usage? Are the costs and benefits of reduced rates for passes and other fares evaluated?

- To what extent does transit management routinely review the overall revenue performance of the transit system? Are there established revenue standards, and if not how is the overall revenue performance assessed? What actions are taken if performance falls below expectations? Are revenue policies changed or are the routes restructured?

- To what extent are revenue decisions made in isolation from service decisions? To what extent does transit management provide the policy group with reports on how price increases might be reduced by delaying service improvements or cutting unproductive service? Is the policy group willing to increase fares commensurate with the escalation in costs, and to reduce fare discounts if necessary?

Performance Indicators

In reviewing revenue policies, the following strategic indicators are suggested:

- Revenue Performance (or user burden) - from the pricing perspective, the most commonly used indicator is annual passenger revenue as a percent of annual operating cost or revenue-cost ratio. This indicates the share of operating costs which are assumed by the users and, as such, is a useful tool in pricing decisions. This indicator can also be expressed as passenger revenue per passenger.

- Cost Performance - from the pricing perspective, a good indicator is annual revenue passengers per dollar of expense. This indicates the dollars which are spent to produce a given ridership level and is a cost-effectiveness measure which is independent of the fare structure. This indicator can also be expressed as total operating cost per passenger or operating deficit per passenger.

Revenue Performance - Revenue performance generally varies by size of property. In Ontario, because of the Provincial subsidy formula, small transit systems are moving towards a revenue performance of 45 to 50 percent, medium transit systems towards a revenue performance of 50 to 60 percent, and large transit properties towards a revenue performance of over 60 percent.

There are instances where the revenue performance does not follow this pattern because the operation is limited to a particular type of service, such as feeder services to line-haul commuter services, or is limited by the service area which may not have matured to the point where it can support efficient services. Consequently, a low revenue performance may not necessarily be capable of improvement by the policy group or management without some major changes in policy. Therefore, it is extremely important when reviewing performance to recognize the non-controllable factors which influence revenue policy and, where possible, to identify what they are and how they impact the revenue performance.

Fare Levels - On the other hand, fare levels are an important item which is controllable by the policy group and which has a major impact on revenue performance. Over the past decade, many policy groups have attempted to attract riders by discounting fares. This has met with only limited success because the transit-dependent market are captive to transit regardless of the price, and the non-transit-dependent market are more sensitive to the level and quality of the service than to its price. Thus, fare discounts usually result in a lower revenue performance and higher deficits. Generally, the transit properties who have the highest revenue performance in their size category, have simple fare structures which recognize the value of the product, charge rates which are commensurate with use, and recover losses from discounted fares for special user groups from those agencies who traditionally support such groups. Accordingly, if the revenue performance is worsening or is low relative to other transit properites, the pricing and cost-sharing mechanisms of the policy group should be reviewed, as this is likely one major source of poor financial performance.

4.4 RESOURCES POLICIES

A strategic activity of transit management is the formulation of fiscal, material and staff resource policies for the delivery of the required transit services. This provides the policy framework for both the line operating functions and the administrative support functions within the transit organization, and is normally approved by the policy group.

Policy formulation in this area normally involves determining for a given service and revenue level: the method of operation - public operation or private contract; the organizational structure including the accountability and responsibilities for line and support functions; the qualifications of management, the practices which should be applied by the organization with respect to recruiting, procurement and labour negotiations; and; the capital expenditures and staff compensation levels which should be achieved.

Questioning Performance

In reviewing this activity, the following factors should be examined to confirm that they are appropriate to current conditions and to identify any areas where performance can be improved. Questions to assist in this regard follow.

- What are the resource obligations as set by by-law, as defined in past policy statements, or as reflected by the political philosophy of the policy group? To what extent do these influence recruiting and training procedures, the terms of collective agreements, labour management relations and practices, purchasing and tendering procedures?

- What are the overall resource levels which the policy group has established for the transit organization. To what extent are these levels attainable considering the nature of the transit system and its service policies? For example, are freezes in hiring and major purchases justified? What would be the impact on resource levels of privatization strategies, changes to collective agreements, improved labour management practices?

- What is the role of the policy group versus transit management in the development and application of resource policy? To what extent are the policies broad enough to be useful over extended periods, consistent with the policy group's service and pricing policies? To what extent do they give transit management the flexibility to efficiently accommodate growth and change in operations and inflation in costs?

- To what extent does the policy group get involved in routine hiring/firing decisions, labour negotiations/grievance arbitration, and normal expenditure decisions? There should be minimum involvement otherwise management's reponsibility and accountability will be diminished.

- To what extent does transit management routinely review the overall performance of the transit system's fiscal, material and staff resources? Are there established resource standards, and if not how is the overall

resource performance assessed? What actions are taken if performance falls below expectations? Are resource policies changed or is the organization and its procedures restructured to keep within policy?

- To what extent are resource decisions made in isolation from service and revenue decisions? To what extent does transit management advise the policy group on how to develop the organization to meet growth and change? Does the span of control of the organization cover all major transit functions - planning, operation, maintenance, finance, personnel, marketing? Are lines of authority clearly defined in order that the policy group can hold its managers accountable?

- To what extent does transit management provide the policy group with reports on how fiscal, material, and staff resource allocations might be changed to make the transit operation more productive, thereby freeing resources for service extension and technological improvements?

Performance Indicators

The resources available to operate transit systems are often constrained by limited funds which require that the performance of fiscal, material, and staff resources be maximized, to the extent possible, within established service and revenue policies. While there are a large number of measures which can be used to indicate the performance of transit resources, most of these are specific to a particular transit function and as such, are related to the day-to-day activities of the managers of these functions. From the strategic point-of-view, there are only a few indicators which reflect the overall performance of resources, although measures such as annual revenue passengers per employee and per vehicle do provide an insight into the resources that are required to serve a given ridership level.

Accordingly, strategic indicators should be chosen which relate some unit of production to some unit reflecting the resources required by the appropriate operating function. Suggested indicators include:

- Transportation - revenue kilometres per transportation dollar, per employee, or per pay hour

- Maintenance - revenue kilometres per maintenance dollar, per employee, or per pay hour

- Administration - revenue kilometres per administrative dollar, per employee, or per pay hour

The above indicators will need to be supported by a qualitative assessment of the impact of the above factors on resource performance through questioning the management of <u>each operating function</u>. The strategic indicators, which have been outlined in previous sections of this chapter, will be useful in this regard, as shortfalls in these indicators may be indicative of shortfalls in the resource policies of the policy group. For example, if management are unable to easily

terminate staff, or if there has been a freeze on hiring and vehicle replacements, then operating costs and deficit may increase because of higher unproductive time, overtime and maintenance costs; this would show up in the financial indicators.

The best source of information are the trends in the system's own performance as obtained from annual or other management reports. It is difficult to evaluate the performance of transit resources as compared to other transit properties, primarily because there are inconsistencies in the reporting of hours or kilometres between properties. Thus trends and targets cannot be readily established for comparison purposes.

4.5 BUDGET FORECASTING

One of the most important strategic activities of transit management is the forecasting of capital and operating budgets for the transit system and the presenting of the budgets to the policy group for approval.

Budget forecasting involves estimating, for the next year, the number of passengers by fare category, passenger fares and other revenue by category, operating costs by function, equipment and plant requirements, capital expenditures, debenture interest and other related financial charges. These determine the provincial capital and operating subsidies, and the contributions to the deficits from reserve funds and from other city departments or area municipalities. The budget also establishes the levy to be imposed on the taxpayers of the municipality.

In all municipalities, budgets are submitted for the next year along with a statement giving the rationale for major budget variances from last year's budget. Municipal budgets are also forecast for the next five years in order to provide the policy group with an insight into the trends in revenues and costs as an aid in longer range budget forecasting. These forecasts, when accompanied by a review of the trends in service and costs and an assessment of what has to be done at the policy level, to keep costs within the financial capability of the municipality, represent a five year strategic plan for the transit organization.

Questioning Performance

Budget forecasting is influenced by all of the factors outlined earlier in this chapter. In fact, budgets cannot be prepared without a detailed knowledge of the service, revenue and resource policies of the policy group.

Therefore, in reviewing this activity, the main area to be examined is the interaction which takes place between the policy group and transit management before, during, and after the budget preparation process. Typical questions which should be reviewed include:

- How does the policy group establish revenue and cost adjustment guidelines for the preparation of the budget?

- How is each expenditure justified; for example, is a zero-based budgeting approach used? What trade-offs can be made between budget items?

- To what extent does the budget reflect improvements in service performance and labour productivity? Is the policy group concerned with this or is it more concerned with keeping overall cost increases to a given level regardless of performance?

- To what extent does the budget reflect improvements which will encourage both growth in ridership and efficiencies in operation? Some budgets just recognize the impact of inflation on the services and costs, and because of restraints do not allow for growth.

- During the budget preparation process, to what extent does transit management interact directly with Council to discuss the trade-offs, to review alternatives, to evaluate trends?

- To what extent does transit management consider ways to minimize both the municipal and provincial contribution to capital and operating deficits? Does it consider ways to use existing provincial funds more productively in the improvement of service and/or in the application of more advanced technology?

- After the budget has been prepared and approved, to what extent does transit management keep the policy group regularly informed of budget variances? To what extent does transit management meet regularly with the policy group to discuss ways that the expenditures can be better controlled, particularly those expenditures that are not the direct responsibility of transit management, such as administrative charges and maintenance costs which may be carried out for the transit system by other departments in some cities?

Performance Indicators

The budget forecasting activity determines the cost-effectiveness of the transit system and the financial requirements for the transit organization to meet its service obligations, within the policy framework established by the policy group. Therefore, it is important that transit management support their budget requests with strategic performance indicators and a plan of action which will enable the policy group to judge the cost-effectiveness of the budget when reviewing it for approval. These strategic performance indicators have been explained throughout this chapter. and are listed for reference purposes in the next section. For this activity, all of the available performance indicators should be used in support of the budgeting process.

4.6 INFORMATION SOURCES AND ANALYSES METHODS

Strategic decision making requires management and the policy group to project on paper how the transit system may perform in the future if present service and

funding policies are continued and what may happen if these policies are changed. This requires good background information and analysis procedures. These vary according to the size of the property and the degree of detail desired. A simplified process can be used, however, to provide information for the Phase One review. This involves:

1. Data Assembly - from existing records including:

   - enabling legislation and by-laws;
   - policy documents and statements;
   - key reports which influenced decision-making;
   - performance reports, plans and budgets submitted by management;
   - past five year financial statements (revenues, operating costs. capital costs);
   - past five year operating statements (manpower, vehicles kilometres, hours, passengers);
   - past five year and available future projections of population and relevant demographic data from the City Planning Department;
   - past five year OUTA/MTC transit operating statistics;

2. Past Trends in Transit Performance Indicators

   Plot of the past yearly trends in transit performance indicators including:

   1) level of service - revenue kilometres/capita
   2) ridership level or market penetration - revenue passengers/capita
   3) cost efficiency - operating cost/revenue kilometre
   4) average fare - revenue/passenger
   5) service productivity - revenue passengers/revenue kilometre
   6) financial performance - revenue/operating cost
   7) cost effectiveness - net operating cost/passenger
   8) tax burden - net operating cost/capita

   By way of illustration, plots of performance indicators for Ontario urban transit properties are provided in Exhibit 4.2 at the end of this chapter. The plots are for the last ten years for transit properties serving populations under 100,000, between 100,000 and 1,000,000, and over 1,000,000. The plots show the average within each group and are not indicative of the performance of any one property or municipality. That is, being above or below the line does not necessarily reflect better or worse performance. This varies depending on local policies and standards, also on local demand, the development pattern and and environmental conditions in each community.

3. Past Trends in Municipal Indicators

Plot of the past yearly trends in municipal indicators including:

1) population growth; distribution by age group
2) unemployment rate
3) total revenue and expenditures
4) assessment
5) other indicators to show position of the municipality such as retail sales volume, industrial output, age distribution

By way of illustration, plots of municipal indicators for Ontario municipalities are provided in Exhibit 4.3 at the end of this Chapter. The plots are for the last ten years for the sum of all municipalities. In addition, a plot of the projected Ontario population by age group is provided to illustrate how the age structure is changing.

4. Forecast "Trends" Position with no Policy Changes

Plots of the expected five year trend in level of service, ridership level, and cost efficiency. These trends should be shown as a projection of the plots in Step 2.1, 2.2, 2.3 and 2.4 above, assuming that there will be no change in service or fiscal policies which will cause service, ridership, cost and fare trends to be altered. This step should also include a plot of the expected five year trend in population as a projection of the past trends in Step 3.1. On the basis of these trends projections, the other performance indicators can be forecast as follows:

- by applying the trends in service levels to the population projection, annual revenue kilometres can be forecast for future years

- by applying the trends in cost efficiency to the forecasted revenue kilometres, annual operating costs can be forecast for future years

- by applying the trends in ridership levels to the population projection, annual revenue passengers can be forecast for future years

- by applying the trends in average fares to the forecasted revenue passengers, annual passenger revenue can be forecast for future years

- with this information, five year projections of the past trends in Step 2.5, 2.6, 2.7 and 2.8 can be made.

5. Identify Policy Options

Establishment of "desired" targets for service levels, ridership levels, cost efficiency, and average fares based on changes suggested by a review of past policy and the position of the municipality as indicated by the plots in Step 3. These "desired" targets should be shown on the plots for Step 2.1, 2.2, 2.3 and 2.4.

6. Forecast "Desired" Position with Revised Policies

   Repeat Step 4 using the desired targets in Step 5; and recalculate the performance indicators.

7. Define Service Standards

   Based on the above targets, develop desired service standards for the next five years.

The above analysis isolates and evaluates the strategic performance issues which are under the control of and therefore can be influenced by the policy group; that is, issues related to service levels, revenues, and the cost structure.

4.7 SUMMARY

The review of the strategic decision-making function would involve an assessment of the "trend" and "desired" positions of the transit system, as determined in Section 4.6. These positions are based on assumptions concerning the service levels, revenues, and cost structure which are within the control of the policy group.

This "futures" information coupled with the past trends information and the knowledge obtained from the other sections of this chapter will enable the reviewer to assess:

- how strategic decisions are handled by the policy group and its transit organization;
- what the impact of these decisions are on the past performance of the transit system, and what the impact is expected to be over the next five years;
- and how effective are the communications between transit management and the policy group in conveying the position and future prospects of the transit system.

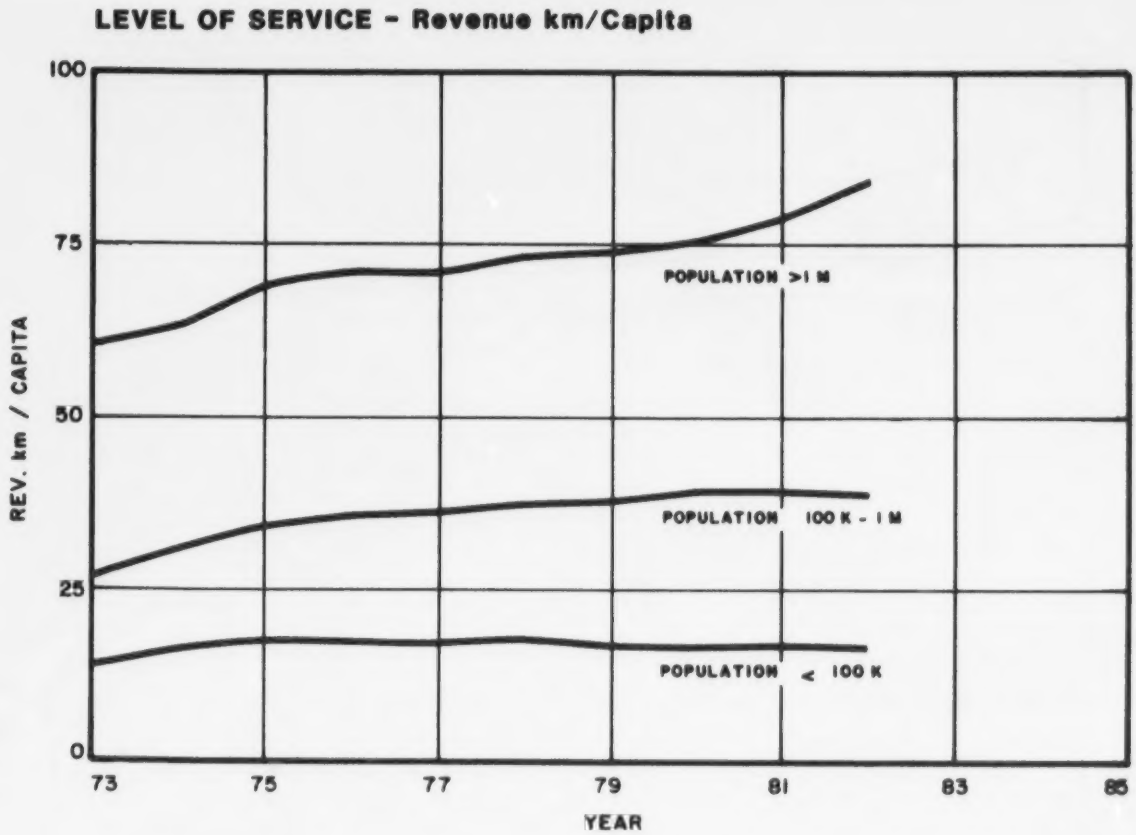
At the conclusion of this assessment, a report should be produced which focuses on how the policy group might modify its policies to improve performance. This should also indicate how the policy group might modify the corporate framework and communications process to aid transit management in keeping it better informed of the strategic issues.

PERFORMANCE INDICATORS FOR ONTARIO URBAN TRANSIT PROPERTIES AND MUNICIPALITIES 1973-1982

Source Ontario Ministry of Transportation and Communications

EXHIBIT 4.2

ONTARIO URBAN TRANSIT PERFORMANCE INDICATORS



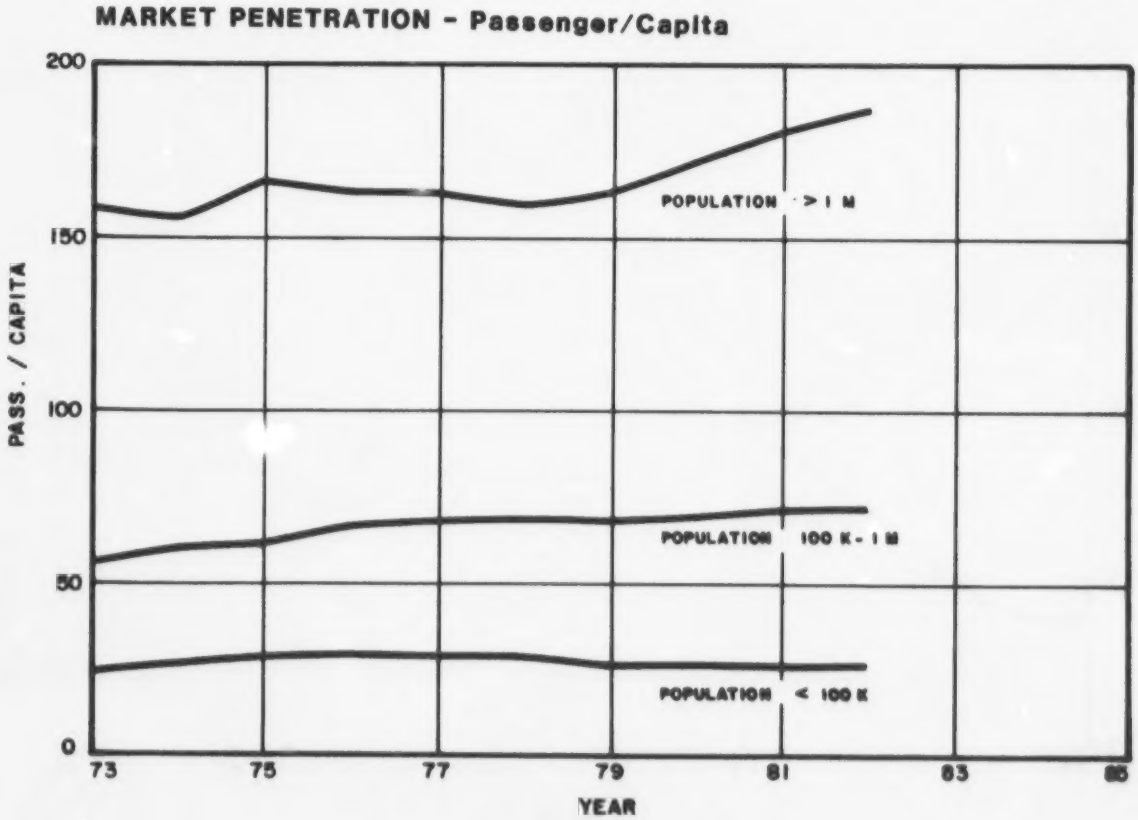
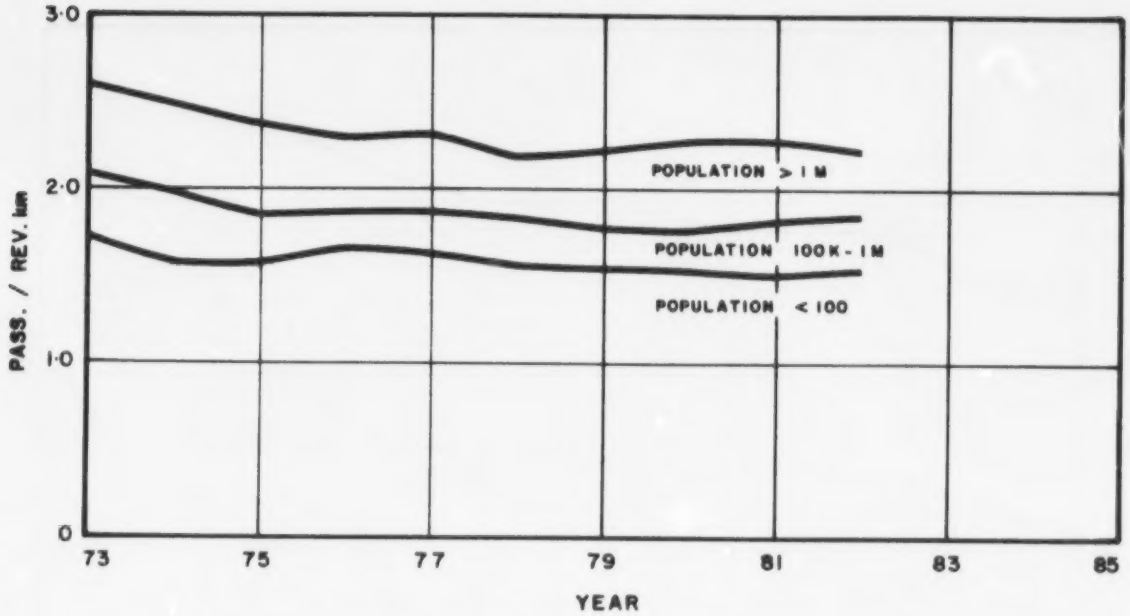


EXHIBIT 4.2.1

ONTARIO URBAN TRANSIT PERFORMANCE INDICATORS

SERVICE PRODUCTIVITY - Passenger/Revenue km



COST EFFICIENCY - Operating Cost/Revenue km

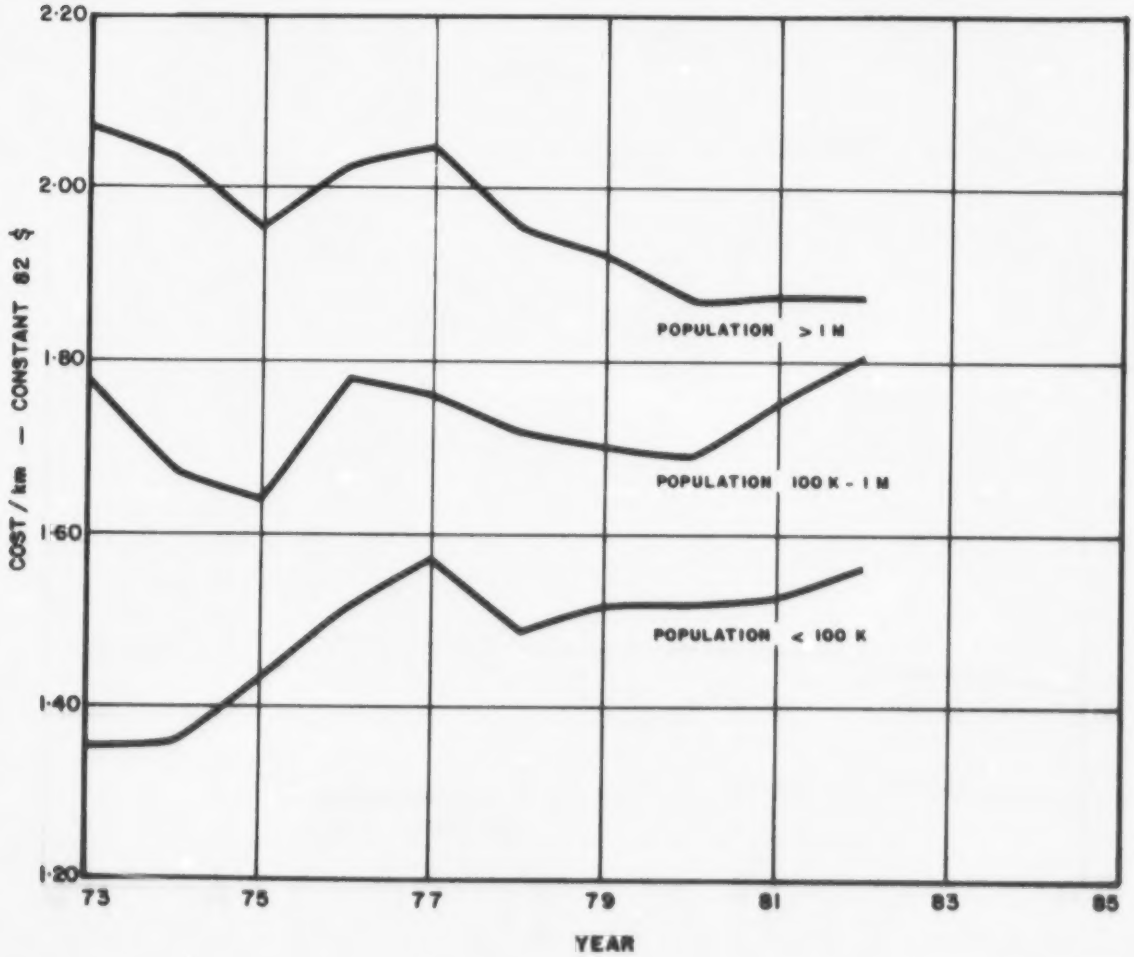
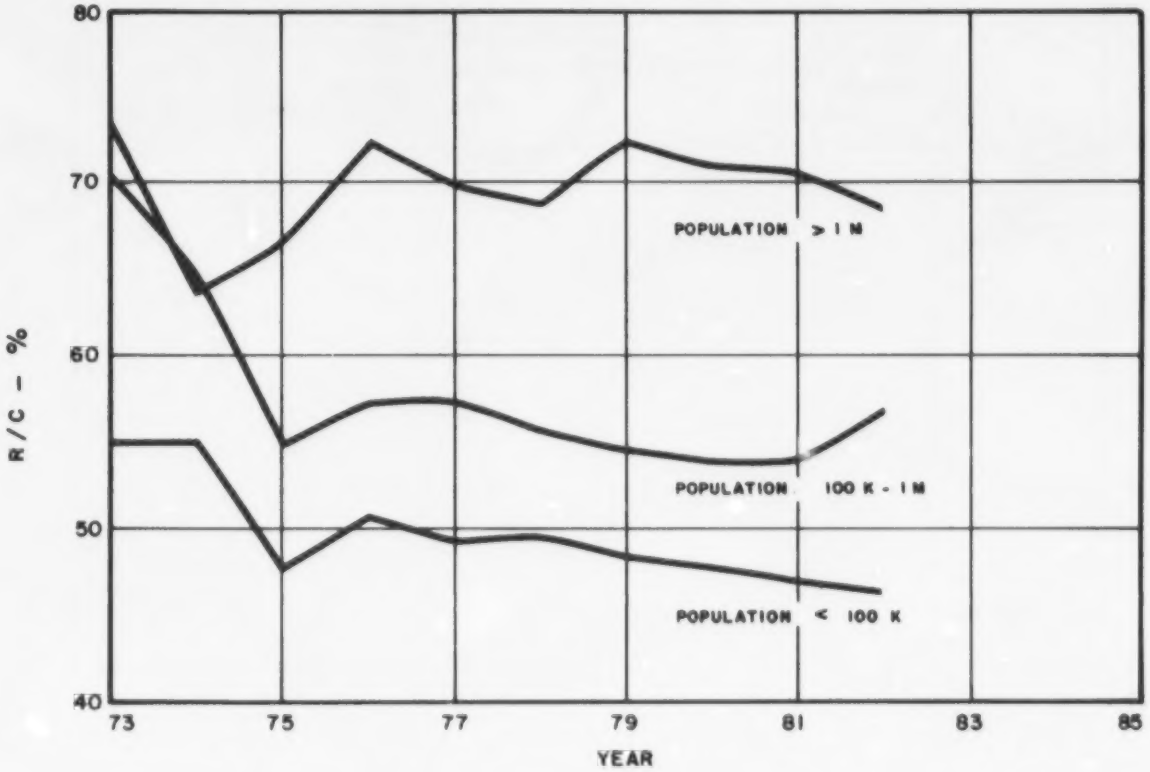


EXHIBIT 4.2.2

ONTARIO URBAN TRANSIT PERFORMANCE INDICATORS

FINANCIAL PERFORMANCE - Revenue/Operating Cost



AVERAGE FARE - Revenue/Passenger

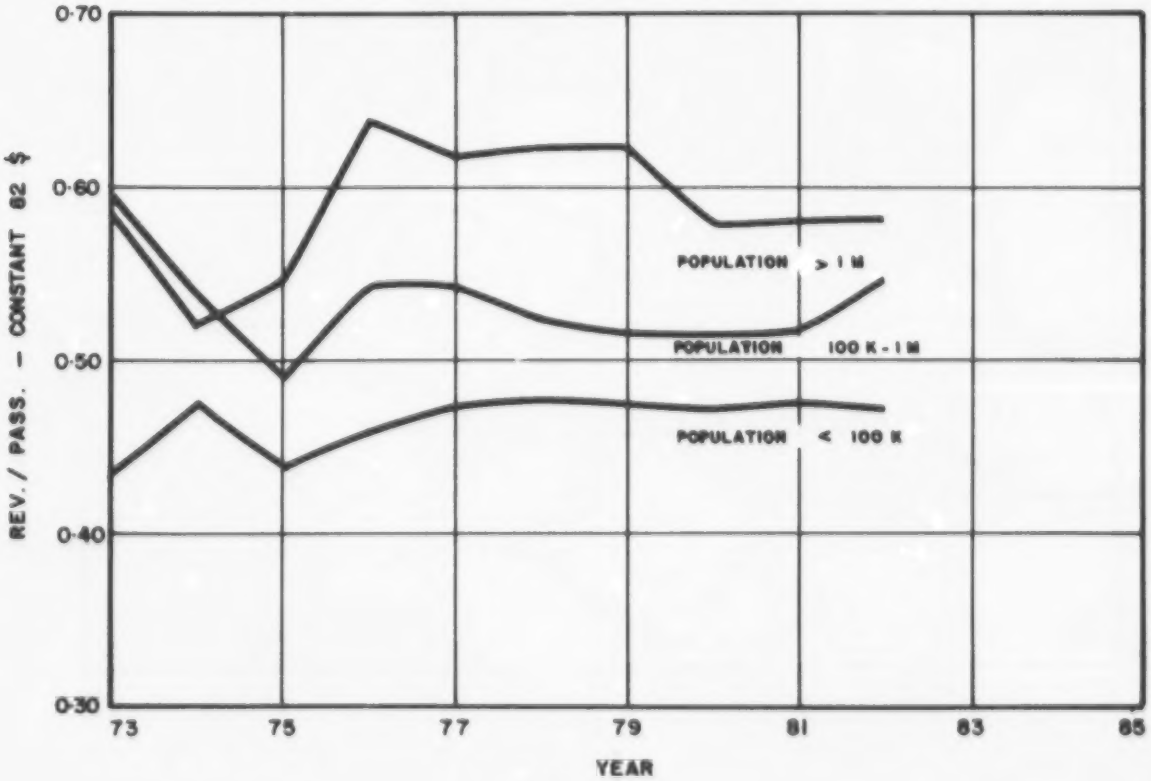
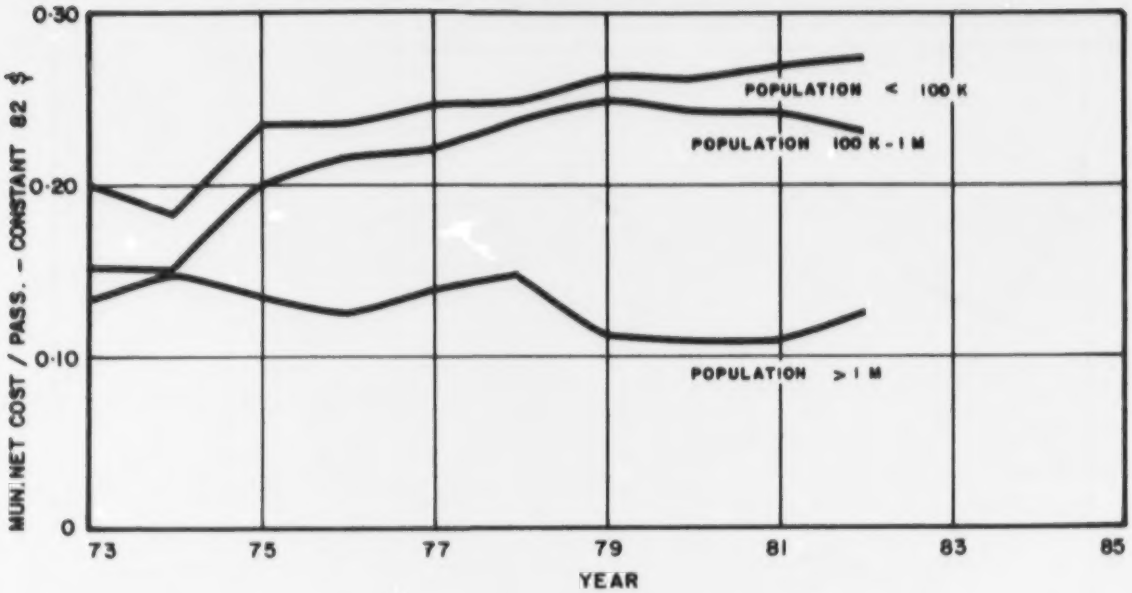


EXHIBIT 4.2.3

ONTARIO URBAN TRANSIT PERFORMANCE INDICATORS

COST EFFECTIVENESS - Net Cost/Passenger



TAX BURDEN - Net Cost/Capita

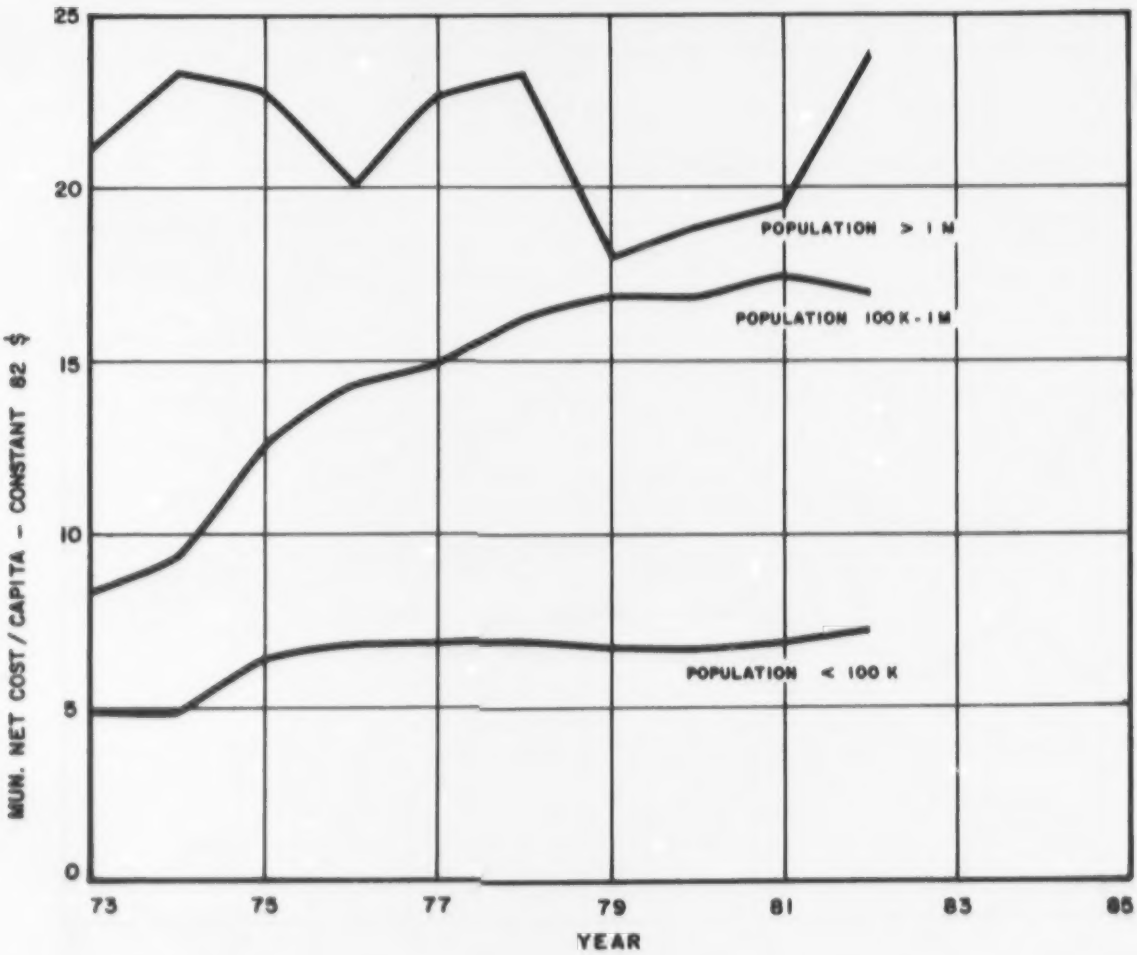
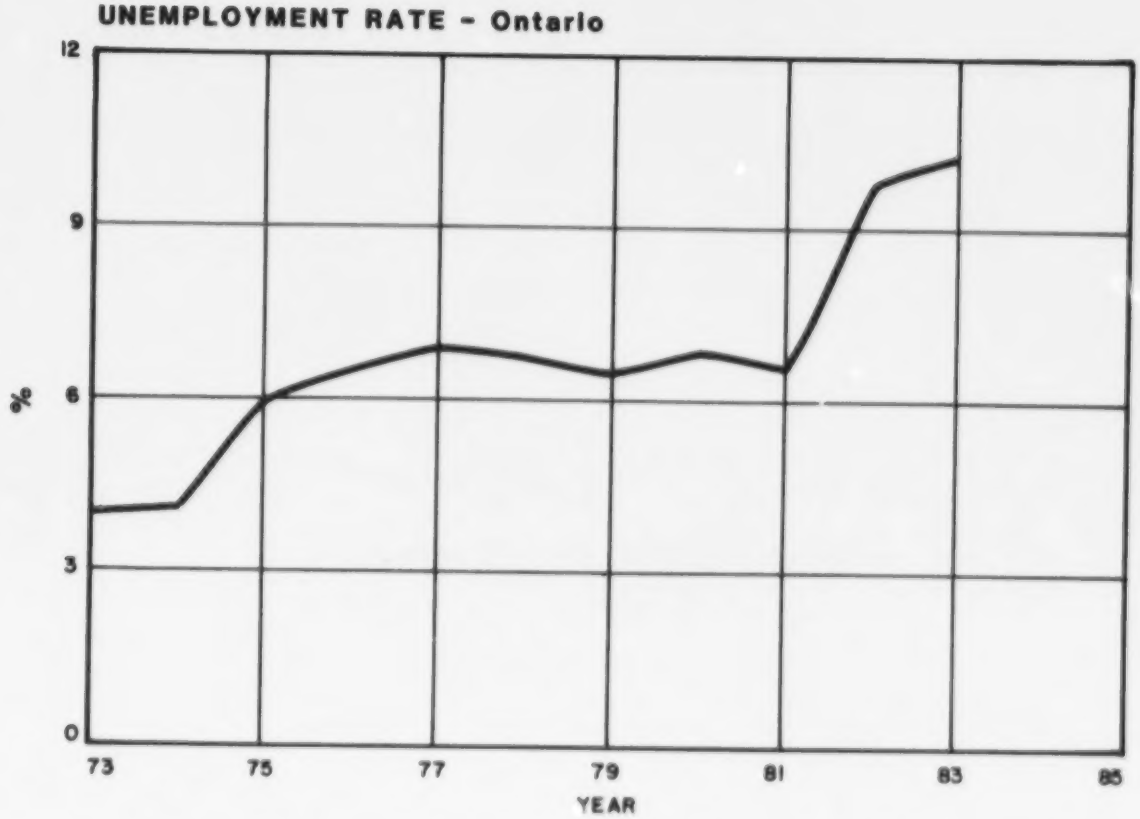


EXHIBIT 4. 2. 4

INDICATORS INFLUENCING ONTARIO MUNICIPALITIES 1973 - 1982

EXHIBIT 4.3

INDICATORS INFLUENCING MUNICIPALITIES



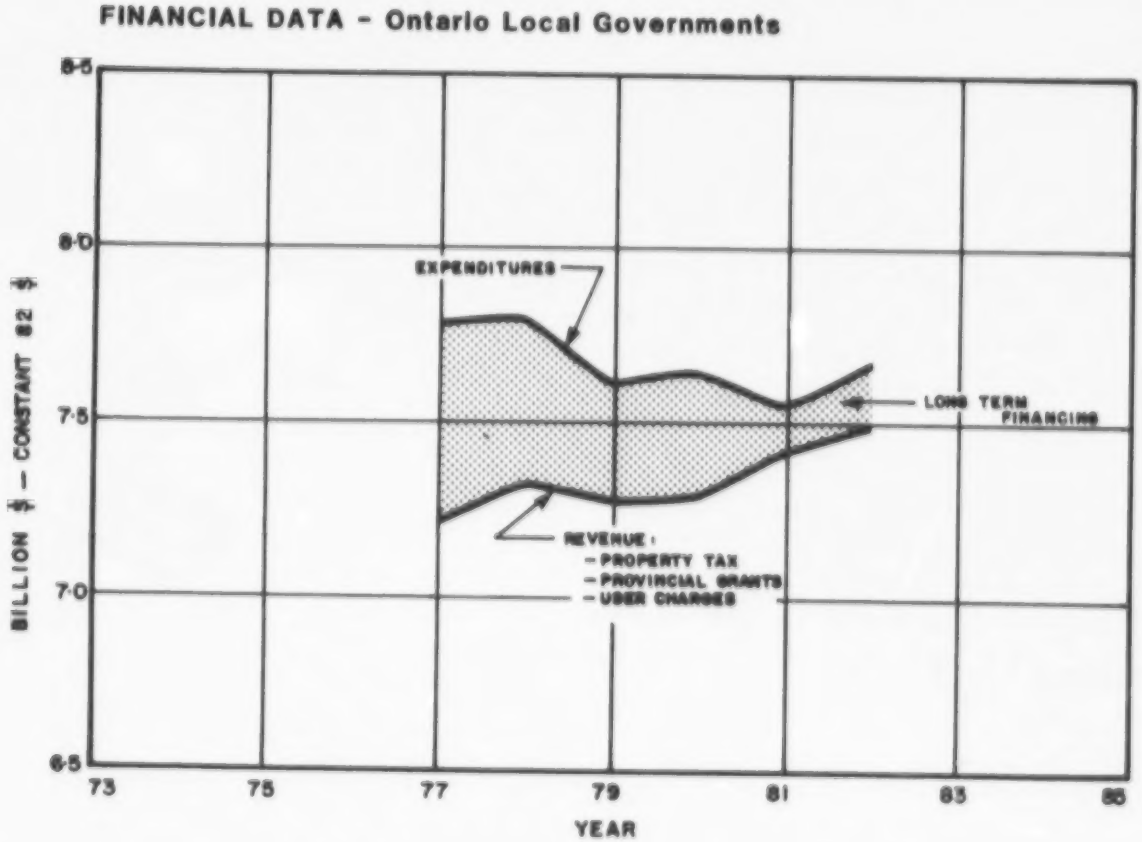
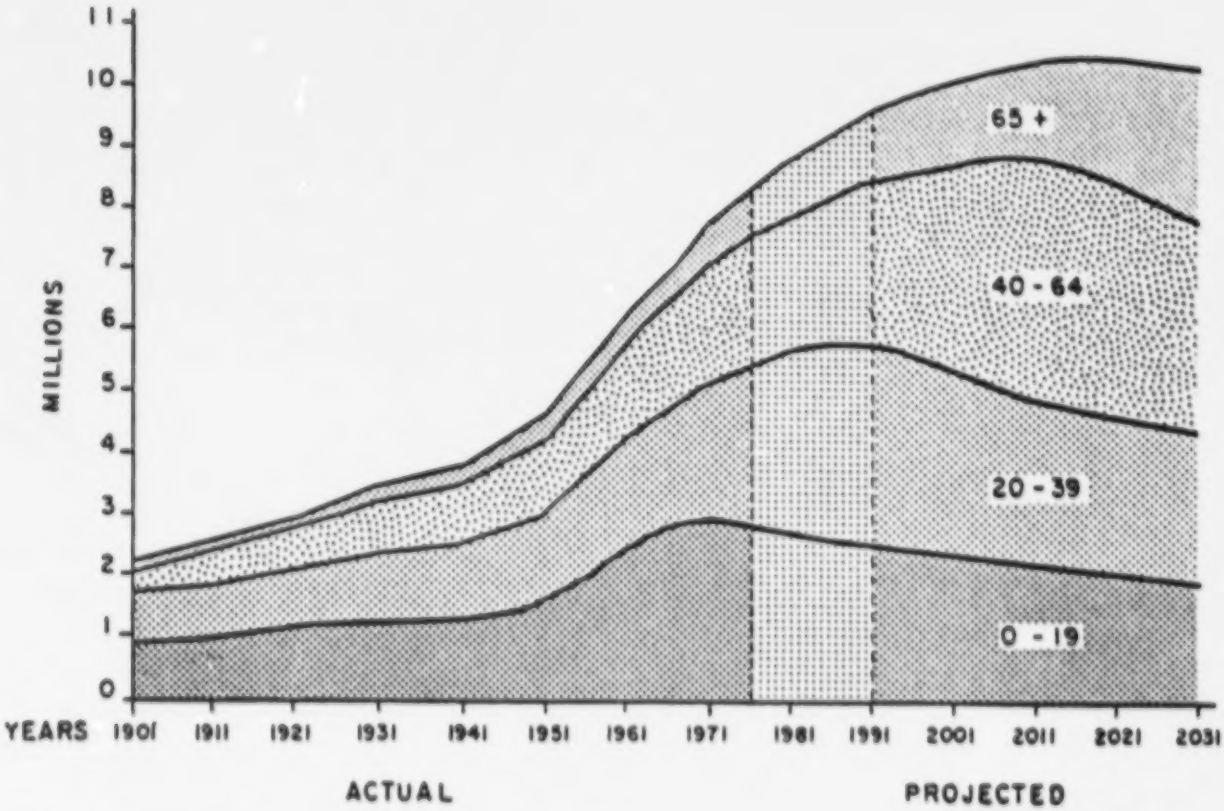


EXHIBIT 4.3.1

INDICATORS INFLUENCING MUNICIPALITIES

DISTRIBUTION OF THE POPULATION BY AGE GROUPS - ONTARIO



MAJOR POINTS REGARDING AGE STRUCTURE OF THE POPULATION

0 - 19	CONTINUE TO DECLINE, PARTICULARLY SHARPLY OVER NEXT TEN YEARS
20 - 39	FAMILY FORMATION AGES INCREASING UNTIL 1991, THEN DECLINING AS BABIES OF FIFTIES AND SIXTIES MOVE PAST CHILD BEARING AGES
40 - 64	CONTINUING TO INCREASE TILL 2001
65 +	INCREASING SHARPLY OVER WHOLE FORECAST PERIOD

SOURCE: D. FOOT, PUBLIC POLICY AND FUTURE POPULATION IN ONTARIO

EXHIBIT 4.3.2

5 PLANNING

Planning activities create a two-way bridge between the strategic decisions that set the overall targets and standards for the transit system and the delivery of the service on the street. They provide information as input to management and the policy group in setting service policies on the one hand, while translating these strategic decisions into routes and schedules for the day-to-day operation of the transit system. They also provide information for marketing the transit services. Planning, therefore, has a major role to play in achieving good system performance that will be effective in meeting the community's needs and efficient in doing so at least cost.

Planning activities may be subdivided into four main areas.

- Service Planning, dealing with the route network and service frequency or headway.
- Operations Planning, dealing with efficient on-street operation of these routes.
- Land Use Planning, integrating transit with local development objectives.
- Market Research, to understand the nature of the transit market.

These four activities overlap to a certain degree and interact not only with one another but with the activities described in the other chapters of this report.

Good planning requires an understanding of the factors that influence system performance. The nature and role of public transit has changed significantly over the past ten to fifteen years. Provincial and local funding have created an expectation that the transit system should be used as a tool to support the social and land development policies in the community, and not only to satisfy its transportation needs. However, there is also a limit to the funds available. Planning is the means by which the implications and trade-offs between these often conflicting objectives can be evaluated before decisions are made in the interests of better service or efficiency to change the service.

Planning is carried out in three levels of detail. Strategic planning, as discussed in Chapter 4, deals with the broader issues of the role for transit in the community into the future. Service planning defines the route network and formulates standards for service over the near term. Operations planning details and fine tunes schedules for day-to-day operation on a seasonal basis. To be effective there must be feedback between each level. Further, planning is not a one shot review with consultant participation; but an ongoing process with someone from the transit system being responsible for a continuing review, once the methodology has been established.

It is recognized that there is a considerable variation in the size and complexity of Ontario transit systems and consequently the review of planning activities should be tailored to meet the needs of the individual property. However, all

properties, whether large or small, must plan ahead if they are to avoid management by crisis. The effort spent in planning will provide background information to make the right decisions concerning service and operations. Information collected for this purpose will pay off handsomely in planning efficient operations and in confirming that this is being achieved in practice.

5.1 SERVICE PLANNING

Service planning investigates the demand for transit service in the community and plans the route network and headways to meet these needs. It influences the system performance by identifying where routes should be added or changed to improve the effectiveness and efficiency of the system. In order to plan service and evaluate the need for changes in the service, policies and standards must be established which reflect the overall service, fiscal and resource policies as determined by the policy group. Decisions on whether to change the route network may then be taken based on an analysis of the impact of these changes on passengers as well as financial performance, using these standards as a guide.

Route Planning - This is the means by which the route network is reviewed and modified when necessary to meet changing conditions. Ridership on existing routes and the requirements to transfer between them will indicate where changes should be considered. In addition, the effectiveness of the route network and headways in serving existing and proposed residential, commercial and industrial development as well as schools, hospitals, homes for the elderly and recreational activities should also be examined.

Ridership counts and origin-destination surveys will provide information on present demand. As discussed later in this chapter, the Official Plan, zoning by-laws and other information from the City Planning Department will identify the location of existing and future major traffic generators to be considered in route planning. Market research will also assist in route planning. The need for route modifications, new garages, etc., is then evaluated considering the implications on costs and revenues. Service policies and standards are required to assist in this evaluation.

Service Standards - These reflect the strategic goals set for the transit system by the policy group. They specify how these goals are to be met in terms of the quantity and quality of service to be provided. They should define the area to be served by the transit system and accessibility standards which specify the maximum walking distance to a route, also the maximum headways and hours of service during weekdays and at weekends. Minimum financial standards for extending or retaining routes should also be given in terms of passenger loadings per bus trip, revenue to cost ratio, or both. Special standards that apply in meeting the needs of the handicapped, the elderly and students should also be spelled out where applicable. The standards may also set targets for travel time as compared to auto.

The availability of these standards will simplify the process of evaluating the performance of present service and making decisions with respect to new services in a consistent manner. Some or all of them may be part of the policies

approved by the policy group, as discussed in Chapter 4, Strategic Decision Making.

Performance Indicators

Performance indicators that will assist to measure the effectiveness of service planning are:

- Riding habits, annual rides per capita;
- Population Served, number of persons in the community having transit service available to them, i.e., within 300, 400, 500 m., etc.
- Modal Split, percentage of persons using transit vs. autos from residential areas, industrial areas, commercial areas, etc.
- Revenue/Cost Ratio, for individual routes and the system, the passenger revenue compared to the cost of providing the service.
- Density, revenue passengers per route kilometre.
- Transit Travel Time, travel time from origin to destination including walking time to and from home and office, number of transfers.

The information for these indicators may be obtained from annual reports, population and employment figures from the City Planning Department, ridership surveys, existing schedules and time tables. Other sources are Statistics Canada and the Ontario Ministry of Transportation and Communications.

Questioning Performance

The types of questions that will be of value in assessing performance in service planning follow.

- o What policies and performance standards currently guide the system operation? What process is followed in establishing the policies and standards?
- o What communication is there with political bodies and community groups in establishing the policies? Do these interested groups understand and accept the role expected of the transit system?
- o How often are the route network and headways examined to determine if they should be extended or reduced? What factors are considered in planning service charges.
- o How many persons will be brought into "the area served"? Is there a significant improvement in meeting the mobility needs of the community? Is this a transit-dependent area?

- How many kilometres will be operated and how much new riding and revenue will be generated? What is the revenue/cost ratio, the passengers/hour or passengers/kilometre ratio, the peak load factor? How do these indicators compare to existing routes?

- How many present riders will be inconvenienced by the change? To what extent? How do these disadvantages of the routing change compare to the benefits afforded to the new riders? How do the trade-offs of advantages and disadvantages relate to the cost of providing the new service?

- What is the nature of the anticipated ridership? Trips not previously made, trips previously made by auto, diverted riding from existing routes, etc?

- How does the travel time compare with private autos? Is it sufficiently competitive to be attractive? Can the speed be improved through traffic techniques, express operation, etc? Will the service increase or reduce traffic congestion? Are there any means of improving these conditions?

- How well does the service meet the various anticipated travel patterns, i.e. work, shopping or school trips? Which are the most important?

- Have the political and community preferences been correctly interpreted? What communication has there been with political bodies, ratepayer groups, etc., in designing the new service?

- To what extent does the new route support development policies and proposals of the community? Is this particular proposal consistent with known future development, both land use and roadway? Will such future developments compromise the routing now being proposed?

- Should the service penetrate the residential areas with a consequent increase in running time, or should the passengers be expected to walk further to a more direct routing? What are the trade-offs?

- Is the new service based on transportation needs, or social obligations? If primarily in support of social objectives, is there a legitimate reason for seeking special funding?

- Is there a need for Sunday, Saturday, etc. service, and is the service proposed consistent with policies and standards?

- Is there a need for additional facilities - garage maintenance facilities, terminals, etc? If so where should they be located? What determines the need - overcrowding of present facilities, excessive deadhead mileage? What is the trade-off between additional capital cost and ongoing excessive operating costs? When will it be required? Are any changes in zoning by-laws necessary to build facilities in a location that will minimize future operating costs?

- What is the priority for Proposal A as compared to Proposal B? How does the timing relate to the budget?

- How does ridership on our system compare to other transit properties and is there a reason for the difference?

5.2 OPERATION PLANNING

Operation planning focuses primarily on the performance of the service provided on each route. It is directly related to the efficiency of day-to-day operations, and requires detailed information on individual route operation. The schedules provided must be based on up-to-date ridership information since this has a major influence on the total operating costs. Service standards and policy headways play an important role in setting the schedules, but regular review is essential to fine tune the service levels on a seasonal basis to meet changing demand. This will indicate where to introduce schedule changes, short-turning, interlining express service, traffic regulations, or other measures to maintain and improve schedule speeds.

In achieving an efficient operation plan for the transportation department, the important factors are those that will improve the attractiveness of service to passengers and those that contribute to the cost of providing the service. The extent to which the effectiveness and efficiency of operations can be improved depends on cost, schedule speed, service regularity, accessibility and convenience.

Cost: The gross cost of providing the service depends on the duration and frequency provided, speed, delays, impacts of the collective agreement, maintenance practices and a host of other elements. Good operations planning attempts to improve efficiency and to control costs by tailoring service closely to demand.

Scheduled Speed: Scheduled speed is one of the major determinants of cost and every effort must be made to improve this. It is affected by traffic congestion, preferential treatment for transit vehicles, parking restrictions, stop spacing, express operation, etc. Travel time is also important for the passengers. It is determined by the operating speed, the distance from origin to destination, the directness of the routing and the number of transfers.

The street system must accommodate the public transit service as well as private automobile and trucking needs and, although many transit improvements can be implemented without adversely affecting other road users, some inconvenience may result. Similarly, parking restrictions benefit transit and others using the road but may be opposed by the abutting businesses. Trade-offs have to be made between higher transit operating speeds and these other interests.

Service Regularity: Service regularity is influenced by schedule adherence, vehicle availability (breakdowns, maintenance practice, spare allocations, etc.) vehicle loadings and stop dwell times, detours, route supervision, short-turning practices, new technology (centralized monitoring and information systems). The allowances in the schedule for layover time to take care of service irregularities should be reviewed to confirm that it is not overly generous, particularly at off-peak periods.

Accessibility: This factor relates to the ability of the service to provide reasonable and convenient access at the home end of the trip and at the work, shopping, school, etc., end of the trip, at the time the trip is necessary.

To a large degree accessibility is controlled by the route planning evaluation mentioned earlier, and the hours of the service (evenings, etc.). These are matters that require a policy decision within the guidelines framework. The location of stops, is also an important part of operations planning. Their frequency and location can have a major influence on schedule speeds and the number of buses required to maintain service on the route.

Convenience: Convenience is a rather broad term that includes accessibility, frequency, overcrowding, but also includes direct ride as well as shelter and protection at bus stops. The important areas for operation planning are convenient bus stop locations and headways that are reasonable while matching the established loading standards. An increase of 5 or 10 percent in loading standards can produce significant savings in operating costs.

Performance Indicators

The performance indicators with respect to operation planning are:

- cost/passenger
- cost/kilometre
- revenue/kilometre
- subsidy/passenger
- vehicle hours/vehicle
- schedule speeds
- schedule adherence
- number of shelters as percentage of total stop locations.
- transfer rate

The sources for this information includes cost data for individual routes' passenger counts at peak point locations, on-off counts and transfer counts at specific locations and waiting times; schedule adherence data; and speed and delay studies.

Much of the information and data listed above must be collected as input for the development of schedules, and other data is essential in the development of operating techniques - reserved bus lanes, preferential treatment at signalized intersections, more stringent parking or turning prohibitions, etc., all of which will improve the performance of the transit system.

Operations planning cannot be performed well without adequate information. The cost of collecting basic information of this nature at regular intervals is minimal, compared to the savings that may be produced and the evidence it provides on the performance of transportation operations for management.

Tracking these indicators over a period of time will indicate whether the system performance is improving or worsening, and suggest the reasons for any change in performance and the areas for closer analyses.

Questioning Performance

Typical questions are:

- How is the present system monitored? Does the monitoring permit performance evaluation? What degree of sophistication in data collection can be justified?

- Of the factors affecting operations, which ones are within the control of the transit authority and should be pursued internally, and which ones are controlled by other authorities?

- Of the factors controlled by other authorities, what data and information has been assembled to seek their assistance and convince them of the need for measures that benefit transit operations?

- What degree of schedule adherence is being achieved? How serious are the variations? What action is required to achieve greater adherence? Can signal timing be adjusted to improve operating speed?

- Would reserved bus lanes be beneficial? To what degree? At what cost to other road users?

- As with reserved bus lanes, are more stringent parking restrictions and traffic regulations warranted? What are the comparative advantages, disadvantages and trade-offs for the transit system, other road users and business interests?

- Are ridership profiles on certain routes such that express or limited stop options can be implemented, possibly attracting more passengers while operating at less cost because of the higher speeds achieved? How many passengers could be convenienced and inconvenienced, and to what degree? Are park and ride lots in conjunction with express services a viable option?

- How are bus stops located to obtain a balance between convenient accessibility and reasonable operating speed?

- What investigations of new technologies have been undertaken, (automatic monitoring systems to improve regularity and reliability, computerized run cutting and scheduling for more efficient scheduling)?

- How do you determine the most appropriate vehicle for varying demands? Is there an opportunity to improve efficiency by operating different vehicles - smaller or articulated?

- How are seasonal fluctuations in demand reflected in the service provided at different times of the day, days of the week, seasons of the year?

- Are there physical restraints affecting the transit system - missing roadway links, railway crossings, access to the transit routes, etc., the elimination of which may be justified in order to increase the viability of the transit service? What action is taken with respect to these limitations?

- How can accessibility be improved as described under land use planning?

- How much would it cost to improve the accessibility in relation to the number of residents affected?

- Would staggered hours improve vehicle utilization by spreading the peaks? Will the community support such a program? Are there additional benefits for the employer and employee?

- How many passengers transfer how many times? What is the average and maximum transfer time? What minor route changes are possible in order to minimize transfer inconvenience?

- What schedule allowances are incorporated to avoid missed connections? Are timed transfer arrangements feasible at major locations? Is the bus physically able to "lay over" at designated locations to minimize transfer inconvenience? What instructions are given to the operators concerning transfer connections?

- What combination of passenger volumes and waiting times justifies shelters? Is it physically possible to establish shelters at selected locations? How exposed is the bus stop location? What amenities do the shelters provide (seating, lighting)? Who maintains the shelters - the municipality or the transit authority?

- Is it possible to minimize or eliminate the cost of shelters by including advertising within the shelter? Can the maintenance cost be part of the advertising contract associated with the shelters? Are service clubs, developers, or similar organizations participating in transit shelter programs? Should they participate? What legal arrangements are required to do this?

- Are standard transit buses the appropriate vehicle for the service under consideration?

5.3 LAND USE PLANNING

The previous sections of this chapter deal with service planning and operational planning, both of which are mainly concerned with planning transit to be effective and efficient in serving existing development on a continuing basis. Land use planning, while not a responsibility of transit management, has a major impact on the future performance of the transit system. Consequently, transit management has to be aware of and have input into the development plans for the community.

Land use planning must include transit as a factor in achieving efficient community plans. The design of the road system and the location of commercial, industrial, residential and institutional developments will have an impact on the strategic planning of future transit service and the ability of transit management to support these developments efficiently, as discussed in Chapter 4 - Strategic Decision Making.

For many years transit services have been operated and expanded primarily in response to passenger demand. However it is also recognized now that transit is an essential element in land use planning. It can assist in the achievement of desirable population and employment distribution, in relieving traffic congestion and in reducing the need for road improvements, with their attendant environmental impacts on neighbouring properties. In short, transit may be used as a tool to support Official Plan policies and land use objectives. However, transit can only do so if the planners and politicians also recognize that good urban planning should improve the efficiency of public transit. This advocacy role is transit management's responsibility, through commenting on Official Plans, zoning by-laws and development plans.

Official Plans, These should protect property for efficient future operations where necessary. This includes items such as terminals, garages and transit right-of-way. High density residential and commercial development should be concentrated along transit routes to improve the efficiency of operations. Careful thought should be given to the location for new community buildings such as schools, hospitals, senior citizen homes and hospitals, to ensure that they can be served efficiently by existing or new transit services.

Development Plans, Residential and commercial development plans should provide for efficient routing and convenient pedestrian access to transit services. Terminal facilities should be considered in large shopping centres. It may be necessary and desirable to modify development plans at some capital expense to benefit the transit rider and reduce transit operating costs.

It may not be possible to satisfy the interests of all parties affected by development proposals. However, good communications between management, the City Planning Department, community groups and private developers will ensure that transit is taken into account in reaching decisions or compromises that will benefit transit operations.

Performance Indicators

There are a number of factors related to land use that must be considered if transit is to operate efficiently in the future. Certain data and information should be compiled to obtain integration of the public transit service with proposed developments while providing assistance to management in strategic decision making as discussed in Chapter 4.

These information requirements include:

- Population Data, current statistics and anticipated growth by location.
- Employment Data, current situation, anticipated growth trends in the composition of employment, i.e., manufacturing, industrial, service sector jobs, etc.
- Social Trends, percentage of women in the labour force, changes in age groups of potential transit riders, and location of elderly transit dependent groups.
- Economic Trends, inflation rates, energy prices, housing prices, etc., that may influence transit ridership.

For public transit to operate effectively and efficiently, it is essential that the community supports the role expected, and from an operating point of view this means land use and development plans that will assist in the delivery of efficient transit service in the future.

Questioning Performance

Typical questions to be raised in reviewing transit managements awareness of and involvement in land use planning follow.

- What working arrangements exist between transit management, municipal planners and developers?
- How does your Official Plan or other development plans affect transit? What is the density of the development and are the high density developments readily accessible to transit service?
- Is the new road system designed exclusively or even primarily for automobile usage? What modifications would improve transit operations?
- Does the residential subdivision plan consist of crescents and cul-de-sacs to enhance privacy without adequate transit routes? How is transit affected?
- Is public transit expected to penetrate the area or will transit passengers walk to the transit service operating on the arterial roads? Are there walkways providing access to the arterial road service? Can they be provided?

- Can the schools, shopping locations, senior citizen homes, etc., be readily served by transit?

- What environmental concerns are generated by the bus service?

- Is there provision for bus terminals, or off-street facilities at necessary locations?

- Does the new development result in route changes which affect current passengers, and if so, to what extent?

5.4 MARKET RESEARCH

Market research provides information on the factors that influence the individuals choice of travel mode and opinion of transit service. These include trip purpose, car ownership, income level, type of employment, travel costs, travel time, comfort, convenience, reliability. A knowledge of the market is valuable both for service planning purposes, as discussed in Section 5.1 and for marketing and promotion as covered in Chapter 3. Without proper market research, marketing and advertising initiatives are by and large ineffective.

Market Identification: Market research is outward looking. It finds out what the existing and prospective customer wants and what transit management has to consider in meeting these needs, rather than treating customers as one group and expecting them to use the service because it is well run according to managements own standards. Market reserach augments the information obtained from the more traditional passenger origin-destination surveys and counts as described previously in this chapter.

Marketing and Promotion: For these purposes it is important to know what specific segments of the population can be attracted to transit and what both the existing passengers and others who live in the community think of the transit services. This will confirm if management is in fact doing a good job in the eyes of users and non-users and if services are well publicized. Market research guides the marketing program by providing background information to make sure that the right messages concerning the transit service and what it is accomplishing are being sent out and received by the passengers, prospective users and the community at large.

A carefully designed home interview or telephone survey supplemented with passenger surveys can provide basic information on travel characteristics and attitudes that will assist in planning activities and marketing programs. Examples of the data to be collected follow:

- Ridership Characteristics; age, sex, marital status, income, etc.

- Geographic Location; origin-destination information

- Trip Purpose; e.g., work, shop, school, etc.

- Frequency of Travel; daily, weekly, by time of day

- Reasons for Using Transit; convenience, cost, no car available

- Reasons for Not Using Transit; travel time, crowding, not convenient, free parking, not reliable, lac of time tables

- System Image; perception of performance and responsiveness to community needs.

Questioning Performance

Typical questions that will assist in assessing managements awareness of the transit market and the effectiveness of their marketing program follow.

o What is the demographic composition of the municipality? Is the size of the student and elderly population groups increasing or decreasing? At what rate? How will ridership be affected?

o What trends have been observed regarding:
  - size of households (single person or family)?
  - population shifts away from downtown?
  - number of automobiles per household?
  - employment locations?
  - senior citizen housing locations, recreational facilities and educational institutions?

o What are the demographics of present riders? Are services and marketing information directed to the right groups?

o What image does the public have of the transit system? Is this positive or negative? How can we improve our image?

o What are the reasons for not using transit? What affordable changes could increase ridership and improve service for existing riders?

o What are the attitudes of the public towards transit fare levels and subsidies?

o What are the attitudes of the public towards supporting transit related transportation policies?

5.5 SUMMARY

The various aspects of planning - service, operations, land use, and market research are essential in bridging the gap between strategic planning and service delivery. This requires a strong data base and full knowledge of the attitudes and considerations that influence an individuals choice of transportation mode.

The review of planning activities will enable management to identify priorities for further investigation where these might be improved to realise better system performance. It may well require input from agencies other than the transit authority, depending on the administrative structure in the various municipalities.

There are obviously going to be a number of trade-offs and compromises in arriving at a system that optimizes effectiveness and efficiency in the transit operation while recognizing community social objectives and the needs of others using the available road system. Good background information, coupled with a frequent assessment of routes, headways and operations, is essential if these decisions are to be made in an informed way.

FOREWORD - PART THREE

This is Part Three of the Transit Performance Review Guidelines produced by the Ontario Urban Transit Association and the Ontario Ministry of Transportation and Communications, through their Transit Productivity Committee. The Committee includes representatives of transit management and Ministry staff. Its objective is to assist all Ontario transit systems to maximize the effectiveness and efficiency with which they fulfill their responsibilities to their local communities.

The contents of the Guidelines are given in the index which follows. In summary:

- Part One provides an introduction and background on the purpose of the Guidelines. It also describes the approach and the steps in the performance review process. As such, Part One should be referred to when using Parts Two or Three.

- Part Two deals with performance in general management, administration, strategic decision-making and planning. These activities determine the overall resources in manpower and equipment needed to run a transit system.

- Part Three covers performance in the day-to-day operation of the system that relate to the assignment of operators and vehicles to service on the street and to the maintenance of equipment and plant.

PART THREE

6 TRANSPORTATION OPERATIONS

Transportation operations involves the delivery of operating personnel and vehicles to meet the requirements of the service plan, according to the work rules established through the collective bargaining process. These activities account for over two thirds of operating costs and, therefore, the efficiency of transportation operations is crucial to the overall performance of the transit system.

This chapter covers those activities which influence the performance of transportation operations, and sets out the information sources and review procedures for evaluating this performance. These activities are:

- o Labour Operations - daily operating activities of operators
- o Scheduling - run cu[illegible] and planned assignment of operators and vehicles
- o Dispatching - daily assignment of operators and vehicles
- o Supervision - supervision of the service on the street
- o Transit Control - handling of emergency incidents

The main requirement of the operations function is to provide the required amount of 'platform hours', which are the times during which an operator is in control of his vehicle. The efficiency of operations is based on assigning operators to provide the required platform hours at the least cost in terms of unproductive time. Accordingly, achieving good operator productivity is the central performance issue. All of the components of labour operations contribute to this.

6.1 LABOUR OPERATIONS

Labour operations involves the performance of operators in their daily operating activities. The time components of these activities follow.

Platform Hours including revenue hours, recovery and/or layover time at terminals, wait time at transfer points, deadheading to/from the routes. The planning function sets the overall platform hours, as discussed in Chapter 5, and thus this component is beyond the control of operations.

Paid Work Allowances for report time, pull-out and relief, clearing time for pull-in and relief and travel time. This time component is established primarily by the scheduling activity.

Paid Work Premiums for spread time, statutory holiday and Sunday work, late night work, overtime. This time component is established by the scheduling and dispatching activity.

Paid Non-Work Allowances for guarantee or make-up time, including cover time on spare-board, authorized absenteeism, coffee/lunch breaks, holiday and vacation time. This time component is established by the scheduling and dispatching activity.

Non-Paid Allowances for authorized and unauthorized non-paid absenteeism such as late in reporting for work, union business and non-certified illnesses.

The scheduling activity determines the allowances and premiums for the operators who have been assigned runs, and the dispatching activity determines this for the operators on unassigned runs. These unassigned runs result from trippers which cannot be scheduled into complete shifts, from the charters and extra runs which are unknown at the time of sign-up, and from the scheduled runs which become open because of service changes and absenteeism.

The paid allowances and premiums together with the platform hours determine the operators' pay hours and, therefore, are the major component of operating costs. The non-paid time allowances, when added to the pay hours, determines total operator hours. This in turn establishes the number of operators required to man the service.

Questioning Performance

The productivity of labour operations is based on the extent to which allowances and premiums can be kept to a minimum. When reviewing this activity, the following questions will assist in examining performance.

- How many Board periods are established in the collective agreement? What is the make-up of the regular and spare boards and the boards that are established for days-off and vacation relief? Are there enough Board periods to give management the flexibility to optimize labour allocation? Do the number of boards within each period limit this flexibility? Do the sign-up rules limit this flexibility?

- What rules are established for the sign-up of regular, spare and volunteer operators? (i.e., regular operators who volunteer to work at the end of their normal shift or on their day-off.) Are these rules in the collective agreement? Can management use volunteers who have time available without incurring overtime or must they distribute the work evenly among all volunteers?

- What are the allowances in the collective agreement? To what extent can travel time be reduced by restructuring the services or by changing the relief procedures? To what extent can pay guarantees be reduced by using more volunteers , or using part-time operators if appropriate?

- What are the premiums in the collective agreement? Is there a spread time limit? Can operators work three-piece runs within a given spread time limit? Is their scheduled overtime on the regular board and if so can this be reduced through restructuring? What is the relationship between the

overtime cost of volunteers and the covertime cost of spare operators on the spareboard? Would there be operating cost savings by increasing overtime and reducing covertime?

- What paid time-off is taken by the operators? Are vacation entitlements increasing because of aging operators (many properties are experiencing lower attrition rates than in the past and an increase in the years of service)? Are floating holidays designated in the collective agreement or are they scheduled by management (designated floating holidays increase the premium paid operators)? Are certification procedures for illness being adhered to?

- What is the non-paid time-off taken by the operators? Is there an absentee control program and if so how effective has it been in controlling absenteeism? What are the absentee trends? How long can an operator be absent without vacating his run? What is the cost of filling open runs on the spareboard?

Performance Indicators

As a first step in evaluating the performance of labour operations, the following overall productivity indicators might be used:

- platform hours/operator pay hours

- platform hours/total operator hours

While comparative historical data are not readily available for these indicators, the experience is that platform hours as a percent of total operator hours might be as low as 60 percent in some properties, and as high as 80 percent in others. The difference is due primarily to absentee levels and the sizing of the spareboard, both of which are under the control of operations management.

If the above overall productivity indicators show a poor performance, then other indicators can be used to highlight inefficiency in labour operations such as average annual days-off/operator, covertime on spareboard as a percent of total spareboard platform hours, volunteer platform hours and cost versus spareboard overtime hours and cost.

The review process will require this kind of background information before evaluating the other operating activities which are discussed in the following sections of this Chapter.

6.2 SCHEDULING

Operators pick their daily driving assignments from a crew guide or sign-up sheet. This is produced by the scheduling department at regular intervals or 'Board Periods' throughout the year. The crew scheduling activity, which is included here under operations, is usually handled in the larger properties by the

planning department because it supplies most of the data base for the preparation of the schedule. The efficiency of the schedule relies on the accuracy and timeliness of the information which is provided to the scheduling department from the sources which follow.

The Planning Function provides route descriptions in terms of terminal and timing points, running times, deadheading time, the desired headways and timing of the service on the routes, the required layover or recovery time - to provide complete cycles for the vehicles and policy headways, and the number and type of vehicles that are required for the revenue service on each route.

The Administrative Function provides personnel management information including the terms of the collective agreements, and any limitations which may affect the number of operators that are available to man the vehicles.

The Equipment and Plant Function provides information on the garaging of the vehicles, and any limitations which may affect the number and type of vehicles that are available to provide the service.

On the basis of this information, the scheduler writes the run schedule for each vehicle, cuts the runs into daily driving assignments, rosters the daily driving assignments into weekly crew assignments for the Board period (to account for days-off), and crews the weekly assignments by preparing the appropriate sheets for operator sign-up. After sign-up, the scheduler produces the following for the guidance of operating personnel:

- The Run Guide, which is supplied each operator, should be detailed enough to permit close schedule adherence.

- The Headway Sheets, which are supplied each inspector, should show enough time points to guide the inspector in supervising the service and controlling schedule adherence. The headway sheets are also supplied to the marketing function for purposes of preparing public timetables and should reflect normal operating conditions.

- The Crew Guides and Sign-Up Sheets, which are supplied to each dispatcher, are modified by the dispatcher to reflect the actual daily assignment and the modified sheets go to the payroll department where premiums and allowances are added for pay purposes. In this process, there should be feed-back from payroll to the dispatcher to reduce premiums and allowances, through efficient time-keeping systems.

- The Kilometre Reports and Pull-Out Lists, which are supplied to the equipment function, should be detailed enough to permit efficient vehicle assignment and preventative maintenance scheduling.

The vehicle schedule and crew assignment essentially represents transit management's plan for providing the required service, given the various constraints imposed by the structure of the service, the work rules of the collective agreement, the equipment limitations, and the policies of the policy group. The scheduler's responsibility is to produce economical and feasible

schedules that adhere to the transit organization's policies and practices while keeping within the terms and conditions of the collective agreement with the operators.

Questioning Performance

Because of the complexity of the scheduling decisions which must be made, there are a large number of factors which can influence the performance of this scheduling activity. The review should concentrate on those factors which have the greatest impact on system performance. The analysis of labour operations, as described in Section 6.1 above, will assist in isolating the important factors. Typical questions to assist in assessing performance follow:

- How does the route structure restrict scheduling efficiency in terms of multiple branches, short turns, deadheading, variable running times, daily and seasonal loading variations, peak to base vehicle requirements? To what extent is there close interaction between the planner and scheduler to work out the trade-offs between the runs that cannot be scheduled into eight hours shifts and restructuring the route to reduce the short pieces of work? Are there enough board periods to enable services to be tailored closer to the demand? To what extent can deadheading be reduced through such measures as a "closed-door" policy or having a satellite garage?

- How do the work rules of the operators affect scheduling relative to maximum spread times, two and three piece split runs, consecutive days off, minimum call-outs, daily and pay period guarantees, use of part-time labour? What has been the trend in these rules? How do they affect the pairing of trippers? Do they permit interlining and differential scheduling? To what extent are trade-offs explored in contract negotiations? What measures might be taken to have better informed bargaining on the part of union and management in contract negotiations?

- How do the policies of the policy group influence scheduling? Do they limit the availability of operators and vehicles? How does this affect crewing and overtime? Does the policy group have overtime restrictions and if so how does this affect dispatching? Does the policy group give management the budget to hire and train experienced schedulers and to what extent can management acquire appropriate support in terms of traffic checking and computerized scheduling systems?

- How proficient is the scheduling group? Is the scheduler experienced in handling large amounts of data simultaneously? To what extent does he adhere to the terms of the collective agreement while continuously exploring feasible ways to minimize the wage bill for the required service? To what extent does the group regularly attend courses to upgrade their scheduling skills? To what extent would computer systems aid in the scheduling process (such as RUCUS or the mini-scheduler)? Are these being considered or do budget limitations restrict their use?

Performance Indicators

To aid in evaluating the influence of the above factors on the performance of the scheduling activity, perfc.mance indicators need to be chosen that are not influenced by other transportation activities or other operating functions. While platform hours/pay hour is a good overall performance indicator, it is influenced by the scheduling, dispatching and route supervision activities. Therefore it is not indicative of crew scheduling performance alone.

For this review, scheduling indicators should be used which express the time occupied in various activities as a percentage of total operator hours. Suggested time components include:

- layover time (at terminals)
- deadheading time
- travel time
- spread time
- scheduled overtime
- guarantee time.

A further indicator is the number of straight shifts and split shifts as a percent of total shifts.

These scheduling indicators are influenced by the specific work rules in the collective agreement and the operating conditions that are unique to each system. Consequently, the review should use only historical data which is specific to the property, and not comparable historical data from other properties, when judging the performance of the scheduling activity.

6.3 DISPATCHING

Scheduled operators, starting from the garage, report to a dispatcher who assigns a designated vehicle from a vehicle disposition list supplied by the Equipment Department. When a scheduled operator fails to report, or when events dictate a need for additional operators, the dispatcher assigns an available operator from the spareboard or asks for volunteers to fill the open run. Dispatching is basically a time-keeping function which verifies that the runs pull-out as scheduled, that crews are assigned to open runs, and that changes to the crew schedule are reported to administration for pay purposes. As such, it is the main source of "actual" kilometre and hour information on the daily service.

Dispatching is a line operating function because it puts a given schedule into operation in response to events which could not be anticipated when preparing the schedule. The dispatcher's responsibility is to ensure that the response is adequate and appropriate at the time, that the operators on report (on the

spareboard) and volunteers are used efficiently with a minimum of overtime, and that the daily assignment of vehicles and operators are reported accurately to administration.

Questioning Performance

The following questions will assist when reviewing the dispatching activity.

- What are the restrictions imposed by the work rules of the operators on the filling of open runs by sparemen and volunteers? What advance notice is required? Can scheduled crews be switched, short turned or interlined to accommodate unanticipated delays and absence?

- What are the requirements for open trippers and unscheduled work on the spareboard? What are the requirements for open runs due to anticipated and unanticipated absenteeism? What are the cost trade-offs between hiring another operator to cover the spareboard versus paying overtime to an existing volunteer operator? What is the probability of paying guarantee time for covering on the spareboard? Is the spareboard at its optimal size, and if not, what needs to be done?

- What are the main components of unanticipated absenteeism (authorized and unauthorized)? How many operators are needed to fill the open runs resulting from unanticipated absenteeism? What components are under the control of management? To what extent are training and discipline a factor? To what extent is the quality of the working environment a factor? Are incentives given for good attendance?

- How efficient are dispatching practices and systems? Are the assigned vehicles parked in order of the time of pull-out and if not how does this affect performance? Does the dispatcher routinely miss runs and if so what are the reasons? How might dispatching be improved through better timekeeping and operator bidding systems?

Performance Indicators

When evaluating the performance of the dispatching function, indicators should be chosen such that the dispatcher's key responsibilities are highlighted as follows:

- average daily missed runs/total runs.
- average daily absent crews (open runs)/total crews.
- guarantee or cover hours/total operator hours
- unscheduled overtime hours/total operator hours.
- unanticipated absentee hours/total operator hours.

While unanticipated absenteeism and unscheduled overtime are not caused by the dispatcher, he can lessen their impact by making use of spare operators and volunteers to cover open runs. Accordingly, a useful indicator of these unproductive time components is unscheduled payroll cost/total payroll cost, including operator wages and associated premiums and fringe benefits.

6.4 SUPERVISION

When the operators have picked up their vehicles at the garage or relief point, they complete their first piece of work, are relieved by another operator or deadhead to the garage where they have a meal or rest break. After the break they travel to a relief point to pick up another bus, drive their second piece of work, and then usually deadhead to the garage where they sign-off. The driving or platform time from garage pull-out to sign-off is under the direct supervision of an inspector or line supervisor.

Supervision involves assisting the operators in maintaining schedule adherence, and in overcoming overload situations and traffic congestion. When problems occur, the inspector makes changes to the service by notifying the affected operators or by requesting additional operators and vehicles from the dispatcher if these cannot be corrected by the available services. The inspectors are normally in contact with the transit controllers or dispatchers by telephone or radio communications.

The supervision activity also handles driver training. If a part of management, the inspector may also assist in the discipline of operators, the administering of the collective agreement and, the arbitration of grievances. In most cases, the inspector prepares a daily report of his activities as an aid to the administration and future planning/scheduling of the services.

The inspectors are the first point of contact for the operators and, as such, have a major influence on their working environment. The inspector's responsibility is to ensure that schedules are maintained along the routes and that corrective actions are taken which are appropriate to the situation such as short turning vehicles, holding vehicles, inserting extra vehicles, taking vehicles out of service, and switching crews when appropriate.

Questioning Performance

The following are examples of questions that will assist in reviewing performance in supervision.

- To what extent do work rules and the crew schedule take precedence over changes which may be suggested by the supervisor? Can the supervisor change the schedule to maintain the headway, if necessary? Does the supervisor completely understand the collective agreement? Was he consulted during the negotiating process and if not why not? Is he a member of the union and if so, how objective is he in the administration of the agreement?

- To what extent do the operators have a good working environment with respect to ready access to the supervisors and clean and reliable vehicles? To what extent does this affect their attitude and driving performance? To what extent are service delays caused by unreliable vehicles?

- Where do complex route structures with multiple branches and blending make the inspector's schedule maintenance activities difficult? To what extent are the inspectors consulted by the planners and schedulers to work-out trade-offs between service planning and crew scheduling?

- To what extent do erratic loading and running times due to traffic conditions disrupt the service? To what extent are they accounted for in the schedule and to what extent do they go undetected? To what extent do vehicles bunch as a result of traffic conditions and running times which are beyond the control of the operators?

- To what extent are training programs available to develop line supervisors? To what extent are the supervisors kept informed of the policies of the policy group and management? Are the supervisors readily accessible to the operators? How are the supervisor's reports acted upon by the administration? To what extent would communications and information systems improve this accessibility and reporting? Would there be closer schedule adherence and reduced passenger waiting times and uncertainty?

Performance Indicators

When evaluating the performance of the operator supervision activity, indicators should be chosen such that the supervisor's key responsibilities are highlighted as follows:

- average on-time performance at key points; percent of runs zero to three minutes late.

- average actual versus scheduled headway at key points.

Operator performance is a key responsibility of the supervisor although poor operator performance does not always reflect on the supervisor. It also is a reflection of a variety of elements such as weather, working environment, communications, labour relations, training, discipline and personnel policies. Nevertheless, because of the supervisor's role in many of these elements, it is useful to know the frequency of the incidents which are caused by the operators. In this regard, possible indicators might be:

- complaints about operators/total complaints from public

- number of operators with more than three operator-related incidents of the same type over a designated period.

6.5 TRANSIT CONTROL

From time to time, an operator experiences an emergency incident while driving the route which will require assistance in the control and clearance. The control and clearance of these incidents is the primary responsibility of transit control. Transit control involves a transit controller taking calls from operating personnel in the field, verifying the nature and extent of the request, and routing the calls to the appropriate people for action. Vehicles requiring on the road repairs or replacement, passengers and operators in distress, traffic accidents, crimes, and fare disputes requiring management intervention are normally handled by this activity.

The controllers are the second point of contact for the operators, after their line supervisors and are the final arbitrator in decisions which affect the operation of the services on the street. The controller's responsibility is to ensure that the response time to an emergency incident is kept to a minimum. He ensures that the service is restored quickly through such measures as notifying police, fire or ambulance services, dispatching road crews and supervisors to the scene, and coordinating the various agencies and crews.

Questioning Performance

The following questions will assist when reviewing the transit control activity.

- How many emergency problems are created by long routes into underdeveloped areas, routes through high crime areas, late night service? Are the controllers consulted by management and its planners on ways to improve the situation?

- Where do traffic and road conditions create erratic loading and operating conditions which cause higher than normal emergency incidents? To what extent does poor road conditions affect vehicle breakdowns? Where are accident and danger spots? What action is taken to notify other City Departments of these problems?

- How do the operators contact the controllers? Can this be improved? What impact does operator attitude have on the emergency incidents? Is a small group of operators involved in the majority of incidents?

- To what extent are the present practices capable of quickly restoring service without delaying the passengers? Can extra vehicles be quickly inserted when there has been a breakdown? Are the present communications systems outdated and if so how might they be improved? How are radio systems being used or misused? Would response and restoration times be improved with more sophisticated transit information, communications and control systems?

Performance Indicators

When evaluating the performance of the transit control activity, indicators should be chosen such that the controller's key responsibilities are highlighted as follows:

- average response time; time from when call was received to when corrective action was taken on the scene.
- average restoration time; time from when the corrective action was initiated to when the service was restored.
- transit related incidents not caused by operators/hundred thousand vehicle kilometres
- non-transit-related incidents/hundred thousand vehicle kilometres

6.6 INFORMATION SOURCES AND ANALYSIS

To review the overall performance of the transportation operations function, the following data sources and analyses are suggested:

1. Assembly of data for the last board period including:
   - present collective operator agreement
   - the service plan and requirements from the planning group
   - the crew guide from the scheduling group
   - payroll records from accounting
   - absentee records from personnel
   - dispatch logs
   - incident reports on operators from personnel
   - other incident reports from the appropriate function
   - inspector's reports
   - controller's logs
   - complaints summaries
   - operating statements for transportation function (staff strength, available vehicles, total operator hours)

- financial statements for transportation function (wages, benefits, premiums)

- interviews with transportation management including schedulers, dispatchers, supervisors, and controllers

2. Assembly of comparative statistics (that is, statistics which have already been collected and could likely be made available by comparable properties).

   - collective operator agreements

   - past 5 year hourly related information (revenue hours, platform hours, pay hours, overtime hours if available)

   - CUTA statistics on man-days lost by property

3. Calculation of the basic overall indicator of operating efficiency for the past 5 years (platform hours/total pay hours); determination of this indicator for other comparable properties.

4. Based on interviews and on an analysis of the collective agreements, estimations of future 5 year "trends" in this basic indicator; establish "desired" targets.

5. Calculation of the unproductive components of operator's time (refer to Section 6.1).

6. Based on the findings of Step 5, identification of the key activities which need further study, and calculation of the appropriate performance indicators for these activities to aid in this study.

Data assembly for the transportation operation activity is a time-consuming exercise, but a worthwhile one. Thus, the above steps have been chosen to reduce workloads by quickly concentrating on the elements which will have the greatest influence on operating efficiency.

6.7 SUMMARY

The review of transportation operations involves the assessment of performance shortfalls as determined from the questions and the performance indicators in the key activities, as suggested in this chapter. It is recognized that only some of these indicators may be available, but these will help in Phase One of the review process.

The principal areas for review to decide if and where performance can be improved follow.

Union Negotiating Strategies, as a means to lessen the impact of restrictions on maximum spread time, split runs, consecutive days-off, call-out for short pieces of work, use of volunteers, use of part-time labour.

Labour Management Practices, as a means to improve operator's working environment and unproductive time such as unanticipated absenteeism, covertime on spareboard, and unscheduled overtime; including systems for optimizing spareboard sizing and unscheduled payroll costs, and for controlling unanticipated absentee levels.

Scheduling Practices, as a means to reduce platform hours using techniques such as interlining and differential scheduling to improve the pairing of trippers; including training methods and computer systems to upgrade scheduling skills.

Supervision and Control Practices, as a means to improve the response to events and the restoration of service when delays occur; including systems for communications, monitoring and control.

At the conclusion of this assessment, the review should produce a report which focuses on where operations management can improve performance of staff or reduce the number of vehicles in service through changes in procedures, the collective agreement or the established policies of the policy group and senior management.

7 EQUIPMENT AND PLANT MAINTENANCE

This chapter deals with those activities that affect performance in the Equipment Department. The function of the Equipment Department is to provide the Transportation Department with an agreed number of clean, safe, well serviced and maintained buses or other rolling stock, where and when needed, at minimum cost.

The major sub-activities undertaken in the Equipment and Plant Department may be classified as follows:

- Organization, Management and Supervision
- Maintenance
- Daily Servicing
- Miscellaneous Garage Operations
- Stores
- Buildings and Plant

Performance in the shop depends on how well the management and staff, individually or collectively, carry out these sub-activities to achieve maximum productivity per man, per shift and per dollar spent in the garage.

Maintenance management for maximum productivity is a three pronged thrust with the Maintenance Chief playing the major role. In addition to setting up the departmental organization and objectives, he must work closely with the General Manager to ensure that management has provided the support and basic elements needed to enjoy productivity and vehicle reliability. There must also be foreman involvement to ensure that the shop methods and procedures have incorporated in them, the hands-on practical experience needed for maximum effectiveness.

7.1 ORGANIZATION, MANAGEMENT AND SUPERVISION

The three levels of management, that is, the General Manager, the Maintenance Chief and the Foremen all influence productivity in the shop. The specific areas in which each of them does this, follows.

The General Manager

Leadership - The General Manager must show evidence of a strong commitment by top management to improve productivity in the shop. This means ensuring that the support and cooperation of other departments, Transportation, Personnel and Labour Relations, Finance and Purchasing are readily available. In addition he must provide the leadership that makes for a positive atmosphere that includes encouragement, support, guidance and good communications so that all personnel clearly understand and are in a position to attain departmental objectives for productivity. He must work for a labour contract that is fair, does not impede working rules, job assignment and other shop methods designed to achieve good productivity.

Support - Proper facilities, with good functional layout, equipment, tools and instruments, as recommended by the Maintenance Chief are also a basic requirement. Your bus replacement policy should conform to the MTC recommendation of keeping the average age of fleet at one-half of the expected useful life of the equipment. Furthermore, the award of tenders for new buses should be based on an evaluation which takes into account initial cost, operating cost and maintenance cost, not just low bid. Finally, the General Manager should ensure that the disposition of buses between the Transportation and Equipment Departments is fair and reasonable so that there are no misunderstandings and each can plan in advance for an efficient operation with full assurance of complete cooperation.

The Maintenance Chief

Administration - The Maintenance Chief should ensure that the General Manager is well informed on major shop requirements which involve large capital outlays. This information should be on record so that it may be presented to the policy board if required. His departmental operations must be well organized. There should be a shop organization chart showing who reports to whom and who is responsible for what. It should be posted on the shop bulletin board together with shop rules, technical and service notes, union matters and employee information. A comprehensive preventive maintenance program establishing procedures and schedules for all scheduled maintenance should be in place. Diagnosis procedures for unscheduled maintenance should also be established to eliminate 'trial and error'. There should be 'targets' for component life in kilometres together with rebuild procedures and schedules to monitor performance so that maximum component life is enjoyed with a minimum of costly breakdowns. Work improvement techniques and work simplification programs should be implemented to eliminate waste motion, waiting time and repeat work. (This is explained further under maintenace.) He must arrange for the provision of records and data to reflect performance, and systematically review these on a regular basis to arrive at conclusions and decisions that will enhance performance.

Training - All shop Foremen and supervisory staff should be given training on how to manage, how to plan work, the importance of records and the written word for issuing work (use of a job-ticket system). All should be kept up to date on new methods and procedures. The Maintenace Chief will normally provide the logic, organization and technical guidance, but when it comes to converting these principles to shop procedures and methods to improve productivity they should receive input from the Foremen to ensure that they are practical at the working level. Items in this category are, the use of instruments, power tools, automatic equipment, jigs and fixtures, diagnostic techniques (trouble shooting), and control boards. The same applies to mechanic training, working conditions and employee morale.

Communications - Communications with other Department Heads, Supervisors, drivers, garage staff and the union is very important. The better the communications, in both directions, the more interest and enthusiasm there will be. The Maintenance Chief should think in terms of a team and of the others on

the team. Also he should remember that his staff is entitled to work satisfaction, recognition and opportunity for advancement and that good productivity and morale generally go hand in hand.

Contracting - The Maintenance Chief should review periodically the possibilities of contracting out work which ties up the shop unduly, for example a bus rebuild from a major accident and conversely, accepting outside work contracts from other transit properties, such as engine rebuild, to keep the mechanics gainfully employed. Also consideration should be given to the advantages of lease versus purchase for tires, batteries, service vehicles and other such items.

The Supervisory Staff

The supervisory staff (Superintendent, Foreman, etc.), in the shop is management's front line at the working level. Its major responsibility is quality - good workmanship and productivity - keeping the staff gainfully employed at all times. The Foreman who can deliver these is one who is basically intelligent and sincere, was a good mechanic and motivates easily. He should enjoy good communications with management relative to operations in general, to specific objectives, to planning and capital forecasts. He is the one who must explain these to the garage staff, and see that they are understood and carried out properly.

Work Planning - The Foreman should plan his work in advance to keep his staff gainfully employed at all times. He should have a job ready for all of his men at the start of every shift. The job should be described on a job-ticket along with the bus number and other significant data. Further, the bus should already be placed in the repair bay by a garage attendant and all the tools and a kit of parts ready and available at the stores counter. The Foreman should follow up on jobs assigned. That is, when the mechanic is about half-way through the job, he should drop by and enquire - "How are you making out? - Any difficulties?" If assistance or guidance is needed, it should be given immediately Before moving on, he should check to ensure that the mechanic is following the proper procedure and not taking short-cuts which would result in poor workmanship or repeat work. Obviously to do this properly he must be thoroughly familiar with all the maintenance procedures.

Good Work Controls - The planning of scheduled work to be assigned to the staff should be logged on a daily control or work sheet so that the Foreman has a record of what job every man is on and when he should be finished. He should always have in advance for the mechanic a new job-ticket for his next job and ensure that the mechanic gets into it with no delays as this can be a serious source of lost time. At the end of the day the daily work sheet, which was prepared in advance for planning purposes, becomes a record of the day's work. This routine should apply to all scheduled work done in the shop and should occupy about 75 percent of the staff. The remainder should be available for unscheduled work such as road calls, trouble shooting and other such jobs which come up at the last minute.

Diagnostic Procedures - The Foreman has to ensure that unscheduled maintenance is properly diagnosed. Unscheduled maintenance is breakdowns,

malfunctions and failures that occur between scheduled maintenance calls. The most common examples are poor or grabbing brakes, hot engine, no power, dead battery and, in the winter, no heat and improper door operation. To correct these faults there should be a diagnosis made to establish the cause and then to correct it. If not, the same trouble will occur again and create repeat work. To check and control this possible loss in productivity, the Foremen and Maintenance Chief should collaborate on the development of diagnostic procedures using past records, instruments, etc., which check out in order of occurence, the usual causes of failure. These should be written up as diagnostic sheets, leaving space for the mechanic to record entries such as 'yes' or 'no' or an instrument reading. Then, mechanics should be trained on the understanding and proper use of the diagnostic sheets. It is vitally important that trial and error not be permitted as, too often, this leads to repeat work. Repeat work represents wasted effort and wasted dollars.

Supervision - Good communications by the Foreman can contribute to good union relations. The Foremen are in the position to sense union and employee attitudes as well as the beginning stages of negative situations. These should be drawn to the attention of the Maintenance Chief immediately so that some action, usually a meeting with the union can be taken to clarify or rectify the situation. Foremen, however, must not accept laxity or delays in personnel getting at a job as soon as a job-ticket is issued or when coffee break is over. Also personnel collecting around the stores issue counter, particularly at start and end of the shift should not be tolerated. But to enjoy good shop morale and to motivate personnel, the Foreman's best approach is "honesty and sincerity".

Records - The Foreman should receive proper records and reports on oil consumption, maintenance costs, component life, road calls and the like for control and monitoring. It is important that these be forthcoming on a regular basis. Similarly, schedules of buses due for inspections and other scheduled work programs must be obtained on time.

The Smaller Shop - In smaller shops, the Foreman is often in charge of stores, initiates purchase orders and prepares most of his own records and paper work. This can be time consuming and cause productivity to suffer. Management must consider when to provide a clerk to do the paper work so the Foreman can get out on the floor to supervise his men and plan his work.

Performance Indicators

The indicators by which the maintenance management team performance may be measured are:

- Bus maintenance cost in cents per kilometre.
- Total cost of garage operations, that is, maintenance, servicing and miscellaneous garage operations in cents per kilometre.
- Man hours per 1000 kilometres for bus maintenance, servicing, miscellaneous garage operations and total garage operations.
- Kilometres per road call.
- Number of grievances per month.

- The general appearance and cleanliness of the bus fleet based on opinions of passengers, drivers, the public and the media.
- Repeat work.
- Spare bus allotment kept for maintenance and the number of times the agreed to number was exceeded.
- Number of buses unserviceable for more than one week.

Performance in the garage may be more readily appraised if it is divided into the separate major accounts that contribute to the overall performance as follows:

1. Maintenance: This covers all labour and material used in repairs, inspection, rebuild, etc., including outside work but not including accidents. The maintenance labour is usually that of mechanics only (but mechanics do not necessarily do maintenance work only). The cost of accidents (as for tires) should be shown separately as it is not a measure of how well the bus was designed and manufactured or the cost of maintaining it.

2. Servicing: This covers all the labour and material used in the daily servicing operations to prepare the vehicle for use the following day.

3. Miscellaneous Garage Operations: This covers all labour and material used by garage staff on work which is not maintenance or servicing, such as steam cleaning, interior wash, making bus changes, moving buses, starting and placing buses, etc.

4. Buildings and Plant: This covers labour and material for building and plant maintenance, painting, inspecting and repair of garage equipment, janitorial services, etc., shelters, bus stop poles and signs, grounds, etc., and other, not related directly to bus work.

5. Fringes and Benefits: The labour charged to the above accounts should be direct labour only. All fringes and benefits which consume labour such as coffee breaks, wash up time, holidays and vacation, etc., should be charged to a separate account. This will help all concerned to appreciate that based on the 2080 hour year (40 hour week x 52 weeks) the average hourly paid garage worker actually puts in less than seven working hours per day.

The cost of labour for storesmen and clerks should be kept in another appropriate account. The same applies to supervisory personnel.

By keeping these items in separate accounts it is relatively simple to convert them into cost per kilometre. By taking labour only and dividing by the weighted hourly rate, man hours may be determined to provide man hours per 1000 kilometres of service. The advantage of using man hours is that the escalation in the cost of labour is no longer a factor so that comparisons to other years (or properties) may be made quite easily. On larger properties an even more detailed breakdown should be considered to indicate the cost of the maintenance operations and major bus components and parts. It can also indicate the relative merit of the type of bus used. An example of this is shown in Exhibit 7-1.

TYPICAL BREAKDOWN OF BUS MAINTENACE COST
FOR MEDIUM SIZED URBAN TRANSIT BUS FLEET (1982 DOLLARS)

Account	Labour Man-hrs/1,000 km	Material Dollars/1,000 km
1. Brakes, reline	0.50	14.80
2. Brakes, running repairs	0.35	0.30
3. Engine	0.45	6.40
4. Engine oil & filter change	0.15	1.05
5. Fuel system	0.20	2.60
6. Front axle & steering	0.15	3.40
7. Rear axle & diff.	0.15	2.60
8. Suspension system	0.30	7.20
9. Transmission	0.40	13.50
10. Air system	0.15	3.40
11. Cooling & body heat	0.35	3.40
12. Electrics & batteries	0.45	10.60
13. Body, paint, doors & w/w	0.65	10.20
14. Upholstery	0.15	0.45
15. Inspections	0.60	-
16. Tires	0.25	11.40
TOTAL MAINTENANCE	5.25	91.30

Average hourly rate = $12.00

The above figures represent a reasonably well managed bus maintenance operation of around 150 buses. The breakdown of costs is typical for a fleet of 12.3 m urban transit buses with average age, 8 years.

These data may be converted to cents per kilometre as follows:

labour cost - 5.25 x $12.00 = $ 63.00

material cost = 91.30

Total cost = $154.30 per 1,000 kms.

$$\text{maintenance cost} = \frac{\$154.30}{1{,}000} = 15.43 \text{ cents/km.}$$

Note: The above includes only direct labour and material cost used to maintain, inspect and repair buses and bus components. Any work contracted out should be included as material cost. It does not include servicing, miscellaneous garage operations, accidents and fringe benefits.

EXHIBIT 7.1

Labour productivity in man hours per 1000 kilometres and maintenance cost in cents per kilometre can then be plotted to indicate trends and performance. An example of this is shown in Exhibit 7-2. The costs are expressed in current dollars and converted to constant dollars.

For smaller transit systems with a more limited records capability maintenance cost may be reduced to only the following major categories: inspection and lubrication, engine, transmission, brakes, battery and electrical, body, other mechanical, and tires.

The source for all the above data and information is readily available from shop records and time sheets and from payroll and budget control records. In some cases these are produced on a monthly basis but if not they can be found in the annual summary of costs.

Questioning Performance

Management at all three levels should be questioning performance. The questions should be probing for areas of improvement, technically, financially and in employee and union relations. Typical questions would be:

For the General Manager

- Why is the spare bus allotment as high as it is? Could it be lower? What are the trade-offs?
- Is the Transportation Department receiving its proper peak hour bus allotments as planned? Is the Transportation Department completely happy with the Equipment Department performance? Do they have any strong differences which seem to go on and on?
- How does our maintenance cost per kilometre compare to other properties similar to ours? Are they any lower and if so. why?
- How does the general appearance, cleanliness and performance of our bus fleet rate, based on the opinion of passengers, drivers, the public and the media?

For the Maintenance Chief

- Are our facilities, equipment, buses, methods, etc., becoming obsolete? Are we keeping up with technology? Are we using the newest techniques, instruments, electronics, etc., to measure, monitor and control?
- Have we done any cost/benefit analyses this year for new equipment, tools, instruments? Did any of these result in a request for purchase? Were we refused and if so for what reason?

TRENDS IN
LABOUR PRODUCTIVITY AND MAINTENANCE COST

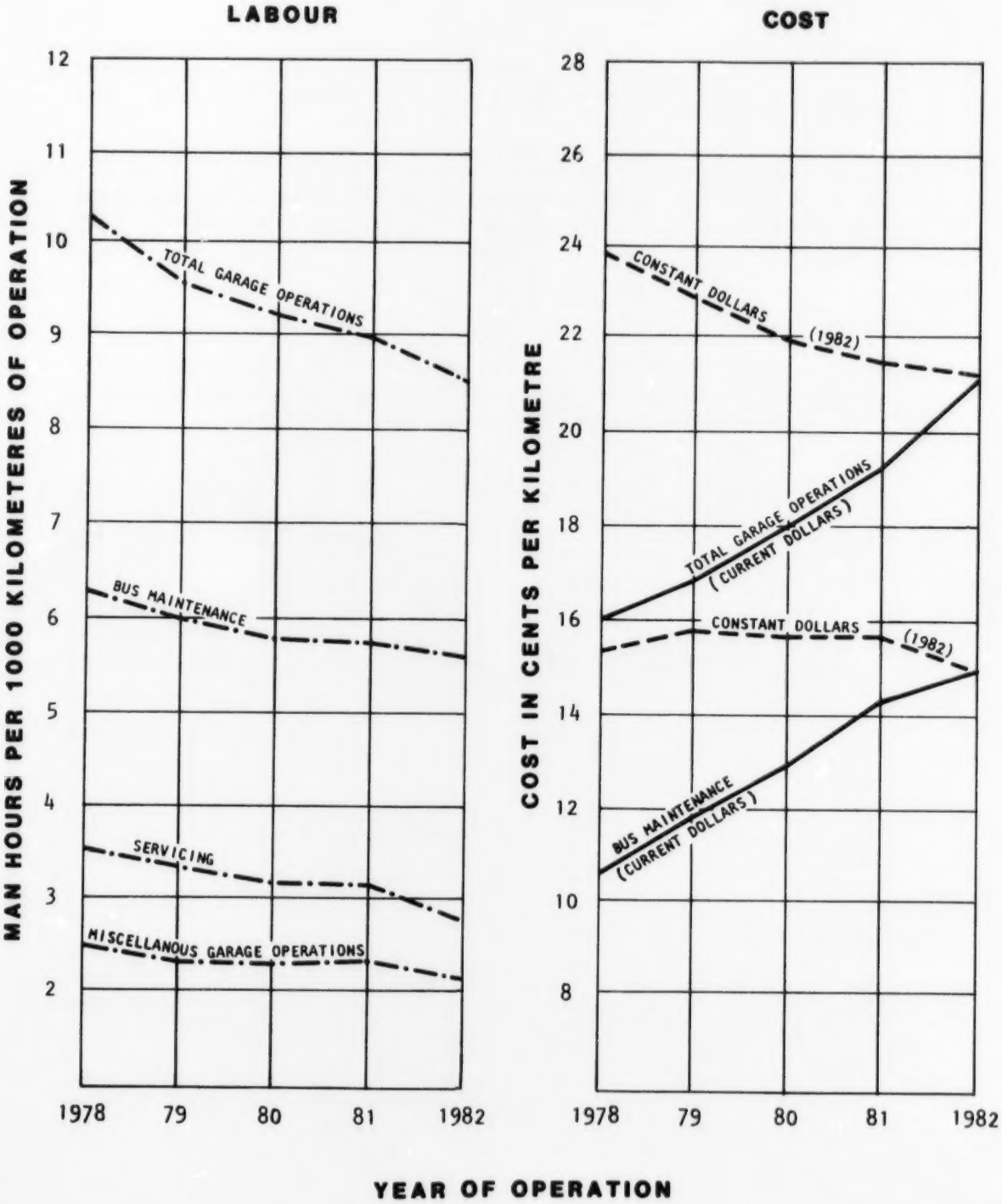


EXHIBIT 7.2

- What should be done to improve our relations with the union? Listen more? Communicate? Invite them to join us in some of our planning? Do some of the foremen need counselling on how to manage men, how to be more effective supervisors?

- Have we probed all the opportunities and principles for eliminating waste motion and put them into practice?

- Are the performance indicators showing improved productivity? How do they compare with previous years? Are there any significant trends indicated from year to year?

- What can the General Manager do to help me and vice versa?

- What are other properties doing that we may learn from?

For the Foremen

- Where are the bottlenecks in my operations? Are they from shop layout, lack of automatic or power operated equipment, tools and instruments, poor documentation or records, lack of parts, inadequate staff and/or training?

- What are the major areas of equipment failure and repeat work? Do I have a good system for gathering this data and analyzing it? Has it been effective in the past for overcoming problems? Maybe it's time I reviewed them with the Maintenance Chief - maybe there is some way of promoting more input, ideas, suggestions, etc., from the mechanics?

- How do I rate as a Foreman? Am I the 'nice guy' type - easy going and pleasant, go along with the men, cover up for them now and then - and in return do the men take advantage of me? Or am I too aloof, strict and rather uncommunicative - to keep the men in line. Is my major concern - "Do they like me?" or "Are they doing a good job?"

- Do I communicate well enough with my staff, my supervisors, the drivers etc.? Does the staff understand and appreciate our objectives, our working conditions, etc. Maybe I should get them together for half an hour now and then, say between 4:00 and 4:30 on Friday afternoon when everyone is tapering off, and talk shop with them, tell them more about our objectives, our problems and answer some of their questions - sort of an informal 'bull-session'. Perhaps the Equipment Manager or the General Manager would like to join in on the odd session? Perhaps this would short-cut complaints and grievances?

- Since we have been reaching for improved productivity which often amounts to a mechanic doing a job in less time because of better procedures, - has our workmanship and reliability suffered? Are mechanics and servicemen taking short cuts to meet the new time standards? Are our inspections and servicing as good as ever? What has been the impact, if any, on road calls?

7.2 MAINTENANCE

Maintenance covers the inspection, repair and rebuilding of major components, transit buses and service vehicles. Lubrication periods and oil changes are usually coordinated with inspections. The maintenance activities fall into two major categories, scheduled maintenance and unscheduled maintenance.

Scheduled Maintenance - includes all types of work and repairs that are planned to keep wear and tear under control so that breakdowns are an absolute minimum. A comprehensive plan, normally termed a "preventive maintenance program", should be put together so that there can be a definite number of vehicles assigned for maintenance with maximum assurance that the Transportation Department will have all the vehicles it needs, at the right place and at the right time to meet its service schedules. The items which fall into this category are inspections, component changes, brake relines, injector changes, in fact any maintenance operation that is repeated at about the same kilometrage interval.

Unscheduled Maintenance - includes the remainder of the work load such as, road calls, running repairs and breakdowns, that is, anything that is unforeseen and must be attended to almost immediately. It should be obvious that if the preventive maintenance program is mediocre, breakdown maintenance will increase. This can be dangerous because breakdown maintenance is more costly, less productive and can frustrate the whole maintenance effort. In other words, reliability and good workmanship will improve productivity not only by reducing repeat work and breakdowns but through reducing confusion, delays and chasing work which cause the planned preventive maintenance to fall behind.

Given good facilities and equipment, a proper choice of bus, technical and managerial competence on the part of the Maintenance Manager and the Foreman, the following factors can enhance maintenance productivity.

Disposition of Vehicles - As mentioned above a schedule for the 'Disposition of Vehicles' should be prepared jointly with the Transportation Department as far as possible in advance, keeping an eye on the experience of previous years and new trends, if any. It should also provide for a dead bus allowance for accidents, which should be included in the Transportation Department allowance. A typical summary of these would be; 10 to 12 percent, 8 to 10 percent and 6 to 8 percent of the active fleet for maintenance for small, medium and large properties respectively, with the remainder going to the Transportation Department for service, spares and accidents.

Work Improvement Techniques - For all repetetive maintenance activities, work improvement techniques and work simplification programs should be implemented to eliminate waste motion, waiting time and repeat work. These should include the following steps.

First review and analyze the job history and records for trends and peculiarities. Then break the job down into elements and draft a procedure that satisfies the technical requirements of the vehicle maintenance manual, incorporates the preferred tools, jigs and fixtures, and is done in the most logical order. Then

train a few average mechanics on this "standard procedure", and establish a "standard time".

"Standard times" for "standard procedures" may be developed for 75% of all the work normally done in a transit garage. They can provide the opportunity to reduce the labour content in most jobs by ten to twenty percent. The employee does not have to work any harder - he simply works "smarter". Ideal applications are jobs of a repetitive nature such as daily servicing operations, inspections, component changes, component rebuild, brake relines, interior bus wash or cleaning, steam cleaning, bus exterior paint job, etc. Standard procedures also ensure that all jobs will be done the same way, the best way. Standard times provide the Foreman with information so that he can plan most of his work in advance with the assurance that it will be completed by the end of his shift and his staff will be gainfully employed at all times.

Management Support - When a Work Improvement or Simplification program is implemented to improve productivity, staff often feel they are working harder because they are given less time. The time reduction is actually a measure of the waste motion that has been eliminated and better tools, etc., that have been provided. Nevertheless there are usually complaints and grievances from the Union in this regard. The General Manager and Director of Labour Relations should be prepared to back up the Equipment Manager and Foreman otherwise productivity gains will be stifled. Management should make it a point to remind the staff and Union that the program has upgraded working conditions which has made their working conditions and procedures easier and better.

Scheduling Work - When setting up the above procedures, the principles and techniques used in work improvement and simplification programs should also be applied where ever possible. For example, to do work required from inspections, move the bus from the inspection bay to an adjacent work bay and do it while it is in the garage, use the inspection sheet of "work required" or "trouble found" as the job-ticket for the mechanic who will be doing the repairs. If possible hold off on minor repairs and schedule them for the same day the bus is being called for inspection; likewise for oil changes, lubrication schedules and unit changes. Mechanics should not work in pairs. If some assistance is required to lift or hold, etc., some predetermined arrangement should be followed.

Component Life - Component life should not be 'fixed' at a predetermined figure. It should be monitored through the use of instruments and the component should not be removed until instrument readings indicate wear or performance has reached unacceptable limits. This ensures long life consistent with a minimum chance of breakdown. The target 'life' may be increased as performance improves and better techniques become available.

Spare Units - To assist in keeping the men gainfully employed and, to reduce vehicle down time, it is helpful if there are on hand an adequate number of spare units. For example, a complete power plant assembly (engine, transmission and components) can reduce bus down time for an engine rebuild from three weeks to two days. And the rebuilding of the various units and components can provide work during peak hours or other times when there is a shortage of vehicles which need work in the garage.

The Use of Instruments - As mentioned in the foregoing the use of instruments should be applied as much as possible. Instruments or any device (even a ruler) that can indicate a positive/objective measure of component condition or performance offers an advantage to improve productivity.

Inspection Program - Inspection calls should be controlled by the Maintenance Department for total control. A very easy and satisfactory system for doing this is relating miles operated to weeks of operation. For example, a Safety Inspection primarily to adjust brakes, called every two weeks equates to about 2 400 km of operation. Then 'A', 'B' and 'C' inspections would simply be a multiple of the above and a calendar can be marked to show inspection calls for up to six months in advance if desired. Inspections should not be permitted to fall behind. Buses for inspection today should have been booked to have the engine compartment steam or spray cleaned a day or so in advance.

Inspection Procedures - All inspection procedures should be organized to eliminate waste motion. After the inspectors are trained on the procedure, a standard time for each type of inspection should be established. This will permit scheduling a given number of inspections per day with almost total assurance that they won't be left unfinished at the end of the shift. Inspections are best done on the day shift when more favourable working conditions prevail.

For all inspections there should be an inspection card or sheet with boxes for all the significant data to be recorded and a check list of all the items to be inspected. Also there should be a companion procedure written up for each inspection outlining in detail specifically what should be done, why, how and what tools, instruments, etc. should be used. It should be as objective as possible. If subjective terms such as check, test, inspect, etc., are used on the inspection sheet, maximum and minimum tolerances and conditions should be provided. For example, check oil pressure on the inspection sheet should be explained in the companion procedure of the inspection as - "record oil pressure at 1500 rpm after engine is warmed up". All personnel who do inspections should be given a copy of the procedures and training to make certain they are understood and followed.

The procedure should indicate the order in which the various operations should be done. For example, start at the front and progress systematically towards the back - or, in the engine compartment, from the left to the right, etc., (similar to a pilot doing a cockpit check). This helps assure that waste motion is minimized and nothing will be missed. There should be no waiting and watching, for example for the motor oil to be drained - for the air tank to drain, etc. The valve should be opened as required and while draining is proceeding the inspector should be completing other operations. Likewise there should be no fixing and cleaning during the inspection. For example, instead of cleaning air filters (heating system) on say 'A' inspections, have some spares on hand which were cleaned when more convenient, and simply replace the used filter with a clean one.

Inspection Staff - Inspections are one application where the job can be done efficiently by two men. They should work as a team and the work load (time) of each should be equal. The senior inspector (say Class I) should be a well qualified

mechanic. The other (say, 2nd class inspector) may be less skilled and should do items such as checking windshield wiper operation, tire pressures, interior body and seats, etc. Likewise the 2nd class inspector should do all the moving and fetching of buses to be inspected while the 1st class inspector does the recording and gets set up for the next bus to be inspected.

Inspection Follow-up - The repair of defects found on inspection should be corrected as soon as possible after the inspection, by another mechanic while the bus is still in the shop. When buses are in for inspection, components which have reached the end of their "useful life" should be changed. This eliminates bringing the bus back into the shop another time.

Performance Indicators

The measure of productivity enjoyed in maintenance and inspection would reflect the amount of support provided by top management, the extent to which the principles of work simplification and improvement have been applied by the Maintenance Chief, the planning, supervision and guidance by the Foreman and the training and motivation received by the workers.

The most important indicators for performance monitoring would be:

- man hours/1000 kms and material cost/1000 kms for maintenance
- maintenance cost in cents per kilometre
- kilometres per road call
- relative life (kilometres) between component change or rebuild.

Questioning Performance

The Maintenance Chief and Foremen should be constantly questioning the maintenance performance. An analysis of road calls, repeat work and work found necessary from inspections will suggest where to look. The questions should relate to the following:

- Was the failure due to workmanship, improper procedure or poor materials?

- Is the failure unusual? Is it likely to occur on other buses of the same type and vintage?

- Do we have any types of failure for which we don't have an answer? Has it been discussed at OUTA or CUTA maintenance workshops? Did anyone seem to be familiar with the problem?

- How do our maintenance methods, shop equipment, tools and instruments compare with others? Are we using instruments and electronics to their full potential?

7.3 DAILY SERVICING

Servicing is the term used for all the services and operations designed to have the bus properly prepared to go out again for revenue service the next day or for its next run. Servicing is not a repair activity. It has little or nothing to do with repairs and the servicing routine is usually the same no matter how old the bus is or how many hours it was in service.

Likewise servicing should not be considered an inspection even though a check is made for obvious leaks, broken fan belts, mirrors, lights, tires, etc. Daily servicing consumes a relatively large amount of labour, in fact about the same man hours as is usually required for inspections, engine, transmission and brake maintenance all put together.

It is generally not desirable to involve mechanics and drivers in the servicing operation. Servicemen are generally considered a semi-skilled category of worker but are none the less intelligent and if given sufficient training and guidance can contribute a great deal to good productivity and reliability in the servicing operations.

A normal servicing operation usually contains the following elements:

- Fuel refill.
- Check motor oil and "top" as required.
- Check motor coolant, "top" as required.
- Check transmission oil, "top" as required (once weekly).
- "Bump" tires (front and back).
- Check brake pedal "feel" and air pressure drop for brake application.
- Check interior lights, headlights (high and low beam), all clearance lights, brake and reflector, sound horn.
- Check mirrors.
- Check windshield wipers and windshield wiper operation.
- Clean inside (sweep, vacuum or 'cyclone').
- Clean dash, operator's seat, steering wheel (damp cloth) and windshield.
- Check door operation (front and back).
- Make "walk-around" check for dents and scratches to body and bumpers.
- Wash exterior (pass through bus washer).
- Dump farebox (Manager's discretion).

The key factors influencing efficiency and productivity are as follows:

Facilities - Servicing operations are best done indoors. Suitable facilities and equipment are essential particularly a high speed fuel pump and a power operated bus washer.

Procedures - There should be written procedures for the servicing operations. They should eliminate non-productive time, that is, waiting and walking, outline every detail of the servicing cycle and stress the important operations which can prevent "road calls". All the work elements in the cycle should be divided equally among the servicemen who should have some operation to perform, every

step along the way. For example, while the fuel is being pumped using an automatic shutoff nozzle, the serviceman should be doing some other elements of the cycle that will keep him occupied until the pump shuts off automatically. At the same time another serviceman can be sweeping or vacuuming the interior and yet another dumping the farebox. Each serviceman should have a copy of the procedures for all operations and be trained to do them efficiently.

As soon as there are enough buses on hand in the garage to gainfully employ a serviceman full time, servicing operations may begin. It is generally desirable to employ at least two men on this work in event that one takes sick or does not report for work, particularly at night. Productivity losses stem from things such as, allowing the same servicing time and cycle for tripper buses as for buses that have been in service all day - and having the serviceman start his own bus and sit in it for thirty seconds or so waiting for the air pressure to build up. This can be eliminated by having the bus started by the serviceman ahead so that when the next serviceman arrives to get a bus, the engine has been idling at normal speed for a few minutes and the air pressure is up. Obviously, before he boards this bus he should start the next bus so it is ready, with air pressure up, for the serviceman who follows.

Parking and Traffic Patterns - The placement of the buses by the drivers in the storage garage should be such that, when the serviceman has completed the servicing operations on a bus and parks it in the garage ready to get into service, he does not have to walk any more than a few bus lengths to get to the next bus he is going to service. This can eliminate time wasted walking as much as several hundred feet and going from inside to the outside which can cause colds and absenteeism in the winter. This parking pattern can save about 1 minute per bus serviced.

All buses to be serviced should be parked together so that forward driving only is required and all the servicing elements should be done in one pass through the service bay. The buses should require moving once only.

Planning and Flexibility - The Maintenance Chief should keep in mind that although servicing is a repetitive operation it is also flexible. He should constantly review road calls for areas of weakness in the servicing system and in the performance he is getting from servicemen. In addition, as the season changes, so should the operations, e.g. in March when streets are slushy, wet and dirty a very slow pass through the bus washer is required while in the summer the buses may well require washing only every second night. On occasions where an operation is not needed, it should be dropped for another which is not required regularly such as checking for loose wheel nuts, tight windows, etc. Some properties check and 'top' torque oil only once a week.

Farebox dumping is generally incorporated as part of the servicing operations, except where buses are left outside for long periods unattended. The farebox man often is a more senior or trusted employee. To the extent that he does not get involved in operations which require him to come into contact with oil, grease and dirt, he is the ideal candidate to do all the recording and generally control the pace and quality of the servicing operations.

Road Calls - The Foreman together with Transportation Department and Equipment Department heads should appreciate that road calls constitute a significant amount of productivity loss, in addition to damaging schedule adherence and system image. Road calls are the direct result of poor inspection, servicing, maintenance procedures, or workmanship. They can also result from driver abuse, lack of rapport between drivers and mechanics and sometimes Transportation Department and Equipment Department officials, or, from wrong choice of bus or poorly built bus.

Good management, supervision and workmanship can control most of the above but this will often bring road calls up to only a reasonably fair level. From there on it takes good driver attitude and good relations between drivers and the maintenance staff to improve performance. This may be enjoyed if there is a good driver training program in effect.

Driver Training - When a driver is hired, ensure that at least one day of his training schedule is spent in the garage where he can be shown: how the buses are serviced, cleaned and checked every night; how tires are changed, grooved or siped and brakes are adjusted to ensure braking is always reliable, also proper braking procedure, skidding, etc., relative to stopping distance and how a Tapley meter will establish when brakes are OK. He should also be shown how engines are tuned and tested for power output - best done on a chassis dynamometer but an acceleration test (against time or distance) will also do the trick. This should include examples of unnecessary abuse such as an engine burned out because it was driven with the red light on (oil or coolant lost) or a broken transmission casing from trying to 'rock' the bus forward and backward when stuck in deep snow, or transmission parts all 'varnished-up' from the driver 'holding' the bus on an incline with the power pedal rather than the brakes.

The new driver must get the message that he will be driving good equipment which is being well serviced and maintained for his benefit. Furthermore, if ever he wants to know what can or can't be done, he should ask the Foreman not the nearest mechanic or garage attendant. Road calls may be reduced by the use of 'Bus Defect Cards'. These are specially designed cards, left in the bus, so the driver can report and record defects or poor performance which are not serious enough to call for a bus change so that they may be attended to before becoming serious.

When it has been established that a driver has been guilty of abuse to the bus or has called repeatedly for bus changes say for poor brakes which have proved OK by Tapley meter test, etc., the case should be passed on to the Transportation Department for (driver) investigation, training and/or disciplinary action.

Performance Indicators

A generally accepted 'target' for servicing is 15 man minutes per bus or four buses per hour per man. To meet this the Equipment Manager and Foreman must exploit every advantage to be enjoyed in good equipment, facilities, planning and training.

For one man, the elements and times to meet the above standard should be approximately:

- start up and drive bus to fueling island (3 min.)
- fuel bus, check oil, water, tires, lights, mirrors, etc., (5 min.)
- clean interior and check outside of bus, etc., (5 min.)
- pass through bus washer (1 min.)
- drive bus to park, and walk to next bus to be serviced (1 min.)

Total 1 man, 15 minutes.

If the duties are split between 2 men then the total time would be 7½ minutes per bus, which again is 15 man minutes per bus.

Questioning Servicing Performance

If this level of productivity in servicing is not enjoyed, the Equipment Manager should examine his operations and visit properties where it is being done. He should question:

- o Do I have all the right automatic equipment? Are my fuel pumps pumping too slowly? (Should be at least 110 L/minute). Are our drivers staging the buses too far from their final park position and creating abnormally long walking distances?

- o Does my servicing operation contain the right elements? Are we doing anything that could be done better as part of another operation, for example, draining air tanks or adjusting brakes, which could be done as part of my safety inspection?

- o Maybe my servicing cycle is sloppy because it is not organized and not done by one group (or man) in one pass through the service bay? How many man minutes extra is it costing us because we have to 'back' buses into parking spaces or drive around a building, etc., to go from 'staging in holding area' to the service bay and to park? What should we do to improve the situation?

- o Have I really given my servicing operations enough thought? After all, almost anybody can do servicing; maintenance is my 'ball game'.

- o It's a funny thing - since we introduced this new 'production line' servicing system, we seem to be having more road calls for poor servicing. Maybe I'd better look in on the operations to see if they are taking short cuts? This system seemed to work so well in the summer but it sure is falling behind in winter. I wonder if our heating, lighting and ventilation could be a factor?

7.4 MISCELLANEOUS GARAGE OPERATIONS

Miscellaneous garage operations includes all the other work and activities that must be done about the garage that are not servicing or maintenance. The staff is normally semi-skilled. Much of their work is repetitive, such as steam cleaning, bus interior cleaning, tire work, traffic control, i.e. placing buses as they return to the garage and 'putting out the service' by assigning buses to drivers. They are also assigned to make bus changes except when a quick simple repair on the road is anticipated or serious mechanical damage is possible. In the winter time this staff is usually responsible for opening and closing doors. On some properties (medium to small) they inspect, service and repair garage and building equipment.

It is not uncommon for one man to be qualified to do all the above duties, particularly on smaller properties. In a medium to large shop this is not necessary but nonetheless convenient. It also reduces the monotony for the worker.

The methods for enjoying productivity in this area of work are very similar to servicing and maintenance. These are:

Work Techniques and Procedures - The application of work simplification techniques to jobs of a repetitive nature, traffic control and parking patterns and providing written procedures and training for these jobs.

The monitoring of steam cleaning and interior bus cleaning is relatively routine and apparent by observation. The Foreman has to be particularly conscious of "foul-ups" in bus parking patterns and assignments to drivers as they can result in buses intended for inspection or work, getting into service by error. Likewise buses returning to the garage with defects that require attention, if not placed according to some predetermined plan, can cause waste motion i.e. not knowing where a certain bus is and then having to move two or three buses to get it out.

Parking and Traffic Control - Have a systematic parking procedure for buses so that they are not moved two or three times to do one operation and/or two buses don't have to be moved to get at the one behind, etc. This is a serious source of lost productivity on most properties. In the medium to large system, traffic control can be quite important to productivity. For example as the buses return to the garage it is desirable to separate those with minor defects, that is, not more than one man hour to fix; major defects, about a half day job; buses that were on trippers; and buses due for steam cleaning, inspections, brake reline, and/or other booked work.

Some systems have their staff start the buses and bring them out to some predetermined point to be turned over to the driver and warmed up in the winter. This may be condoned if it reduces driver's reporting time and allowance or on smaller properties where it helps to round out an eight-hour day for one man. On the other hand it should be kept under strict control to ensure that it doesn't develop into extra work to give a driver his favourite bus.

If garage capacity is overtaxed, say to "crush" capacity (usually considered 10% over design capacity) moving and placing buses, and traffic patterns become difficult and require additional labour for this activity, particularly during winter months.

The Foreman should look in on his bus starter, who assigns the buses to the drivers, every now and then to ensure that this activity is under control. Drivers sometimes appear almost in swarms, all demanding a bus at once. Obviously some of these have reported late and are in a nasty mood. This can create some hostility and confusion which is often taken out on the bus or on maintenance staff.

Performance Indicators

The yardstick for establishing the amount of staff to do all the above may vary but it is generally slightly less than the number of servicemen required, in fact on the smaller property the same personnel often do both the above categories of work.

It is generally appreciated that the larger properties enjoy the advantage of scale for better productivity. The smaller property sometimes suffers the reverse i.e. difficulty finding work for a man, say on the night shift when for safety reasons it is discrete to have two men on shift but the work load could be handled by only one. This is where the Maintenance Chief has to show some imagination and resourcefulness and overcome the problem by utilizing any spare time to some advantage.

As for maintenance, data sources to measure performance come from shop work records, time sheets and budget and cost summaries.

Questioning Performance

The following questions will assist in reviewing how well miscellaneous garage operations are being performed.

- Are our traffic patterns and parking plans effective? Are they being properly observed? Has our bus inspection program been fouled up lately by buses due for inspection not being in when they should be?

- Should we consider outside parking or should we lease some vacant warehouse space (or such) in order to overcome our congestion and difficulties of moving and placing buses in the garage?

- Are we using the best available soaps, detergents and chemicals in our steam cleaning and interior cleaning? Is our steam jenny operating efficiently? How about our pressure spray equipment for interior cleaning? Do we meet the industry "norm" of three buses per man per day for interior bus cleaning?

- Are the drivers generally satisfied with the system and performance employed for assigning buses to them? How many times per month would there be drivers going out late due to oversight or confusion on our part?

7.5 STORES

Stores staff is responsible for the operation, care and security of the storeroom. Their job is to ensure that the Maintenance Department gets the right parts at the right time with no waiting at the stores issue counter. The size of the property will decide to a large extent how this is done, but the organizational system that seems to be most satisfactory is a shared responsibility. That is, the stores (and purchasing) are responsible to the Finance Officer for fiscal and security matters and to the Maintenance Chief for parts supply, issue, quality and inventory levels. In recent years, many systems have been attempting to put their stores operation on the computer. This can reduce clerical errors in posting, initiate purchase orders and assist in controlling and adjusting inventory levels. However it does not necessarily result in better productivity and the output is no more reliable than the input by the stores staff. It can create confusion if not set up properly, or if done in haste and not checked out with the manual system on parallel operation before final conversion.

Like the Foreman and his repair staff, the Supervisor of Stores is the key man to a good stores operation. He should organize his staff so that the following are well organized and performed.

Organization - The stores issue counter should be serviced efficiently with no mechanic delay and no mistaken parts. All materials and tools issued should be properly recorded. Parts should be coded and stored in bins that are well lighted and easily accessible.

Inventory Control - Maximum and minimum inventory levels should be checked periodically to avoid stock-outs. The Stores Supervisor should ensure that his men know the parts by name and sight and work closely with the Maintenance Foreman when campaigns, such as heaters in the fall, are coming up so he can build up his stock of heater parts above normal maximum to provide for the program.

An inventory count of all stock should be made for fiscal credibility once a year. Obsolete stock should be disposed of as soon as possible as it becomes a burden and a loser - and the longer it is held the worse it gets. If no stock-outs is the norm, this suggests that the storeroom is overstocked. The cost of overstocking must be weighed against a lower amount of capital locked up in inventory and the risk of the occasional stock-out.

Facilities - For good productivity, storeroom layout and the location of parts relative to the issue counters is important. Likewise the location of the storeroom should be such that the issue counters are conveniently close for the maintenance workers they serve. The storeroom issue counters should be visible from the Foreman's office. Good lighting and cleanliness are essential. Proper equipment should be provided for lifting, packaging, loading and unloading.

Free-Issue Items - Class 'C' items (generally less than five dollars in value) such as nuts, bolts, washers, etc. should be made available in "lazy susans", at convenient locations about the shop. Where the volume of rebuild work on air and electric units is great enough to keep one mechanic occupied full time at a work bench, the bench should be fitted with 'uprights' about it that have pigeon holes and hooks, etc. to store a week's supply of the many small items used again and again such as connectors, insulators, gaskets, washers, etc. These should be stocked and charged out once a week by a storesman so that the mechanic does not waste his time going back and forth to the stores issue counter to fetch them.

Performance Indicators

There are three indicators which are a good measure of stores performance. These are: 'stock-outs' per month, total worker man hours per day waiting for parts at the stores issue counter and dollars in inventory per bus.

Inventory per bus will be higher for smaller fleets, fleets of higher average age, and where there is not much standardization or the supply and delivery time is not good.

Monthly reports from the Administration Section should be provided to indicate: dollars in inventory by categories (a) bus parts (b) miscellaneous hardware (c) fuels and lubricants, and stock-outs per month.

The Foreman should be aware of any delays at the stores issue counter and instances of a wrong part being issued. These situations cause delays and indicate that the stores staff require training or that the supervision in the stores is lacking. At least once every three months the foreman should make a random count of the number of workers at the stores issue counter and how long they are there. This should be done for a two or three day period. On a good sized property this can add up to the equivalent of one man day per day. It can represent lost productivity on both sides of the issue counter i.e. the maintenance man and the storesman.

Questioning Performance

The performance and productivity of the stores operations and its impact on other garage activities should be under constant review. Questions to consider are:

- Is our training for storesmen adequate? Is there a system for constant upgrading and familiarization for new equipment and new parts? Are we using the newest visual aids for identifying parts?

- Are the daily work assignments for the storeskeepers properly analyzed and assigned? For example, are there storesmen doing other routine duties about the stores room while five or six mechanics are waiting for parts at the issue counter with only one storesman serving them?

- Are we taking advantage of systems used by other transit properties such as; preparing parts kits for jobs in advance; the use of colour coding; plastic bags to identify minimum inventory levels; preferred methods for mounting and holding awkward parts such as large gaskets, tubing, body parts?

- Have we made any special effort to ensure that our information and communications throughout the stores and between stores and maintenance staff is good? Are the stores staff aware of our policy that good quality, heavy duty parts are necessary for a reliable maintenance program?

7.6 BUILDINGS AND PLANT

Plant covers inspection and maintenance of grounds, buildings, garages and garage equipment, janitorial services, bus stop signs and shelters, and snow removal. If not properly managed it can adversely affect the productivity of the maintenance and servicing operations.

The Supervisor of Plant, who usually reports to the Maintenance Chief is also responsible for building heating and ventilation and for the satisfactory supply and efficient use of gas, water and electrical services. On a medium to large sized property Plant is usually a separate department.

Preventive Maintenance - The keys to good productivity in this activity are similar to other maintenance activities, such as good planning to keep staff gainfully employed, preventive maintenance to avoid equipment failure and unforeseen major breakdowns which create an emergency, such as the door to the service bay getting stuck half closed while servicing operations are only partly done. Since the Plant staff is relatively small it is generally desirable not to occupy it all on one large job while other routine work stands still. It may be better to hire contractors who specialize in heating, electrical, overhead doors, roofing, and then only supervision or liaison is required. On the other hand the Plant Supervisor has to have some specialists on staff so that the system does not become paralyzed any time something breaks down, e.g. carpenter, plumber, electrician, stationary engineer 3rd class, etc. Generally one or two men are versatile enough to cover these areas unless a major problem arises.

A weakness which usually prevails in this section is lack of planning and inspection. This is probably because the supervisor of the section is a tradesman who has not received adequate training or thinks planning is not important. If this is not corrected, there can be disastrous consequences because there are so many serious things that can happen to paralyze operations, for example: a broken door or fuel pumping system to stop servicing, broken or leaking hoist pressure system to render unserviceable up to three hoists, snow drifting to block exit lanes or exit doors and delay service going out. Then there is the small construction job which should last a few days but runs into trouble due to poor planning and drags on for weeks.

Emergency Equipment - To avoid these problems, the Supervisor of Plant should have: some emergency equipment such as, pumps, lighting, standby motor-driven

generating unit with sufficient capacity (say 10 to 15 kW for fuel pump and about ten lights), spare springs for overhead doors, and at least one piece of snow removal equipment (say a front end loader with a 3 m^3 bucket). He should also have a list of personnel and contractors (phone numbers) who have agreed to respond to emergency calls.

Annual Work Plan - The major amount of work for the entire year should be planned so that it can be handled with minimum delay and cost. This requires a steady flow of work designed to keep the regular staff employed and for the big jobs to be handled by others. For example, the employment of summer students to clean and paint buildings every second year or so, or to clean up grounds, boilers, etc., can keep the permanent staff free for their normal duties. All the permanent staff should have some special training in skills. Unskilled labour should be hired on a part time basis as required.

It is imperative that none of the work undertaken by the plant staff interrupts the flow of buses. If ever it is necessary to shut off the power, water or gas to change or service some major piece of equipment, the timing should be set so that the disruption or inconvenience to other garage operations is minimal.

Communications - The Supervisor of Plant should maintain good communications with the Transportation and Planning officers for the installation or changing of bus stop signs. This could amount to as many as 50 over a five kilometre route when a significant route change is made overnight or over a weekend. To cope with such demands he should have a truck fitted out to carry all the material required such as poles, signs, fasteners, adhesives, cutters, and diggers, to do this efficiently and effectively. The same applies to shelters and benches, etc.

Performance Indicators

The performance of the Plant Supervisor and plant operations is primarily a measure of how many delays and unnecessary breakdowns occur per year. He has to ask himself if he has resources ready and available to fall back on in event of any emergency. In addition, he has to be prepared to address any possibilities of emergency such as fire (note: fire drills) and safety.

The data sources and monitoring of the buildings and plant activities should come from the final report on the year's operation and from capital expenditures and forecasts.

Questioning Performance

The Building & Plant Supervisor should have in place a process for reviewing his operations and their impact on system productivity. He should question:

- Are there any significant capital projects that should be considered, e.g., building modifications or additions, to improve system productivity? What do the Transportation and Maintenance Departments have in mind in this regard? Do we have a five year projection of capital needs for plant renovations or additions?

- Are we attempting to do work that may cost less or be better done by contractors?

- Are we suffering due to the lack of costly equipment (such as, snow moving and loading) which cannot be justified economically? Have we explored other approaches, say rental, or an agreement to service and maintain the equipment in return for its use?

7.7 SUMMARY

In addition to providing good physical plant, facilities and equipment, the General Manager's role is to create a progressive atmosphere and show evidence of a firm commitment to improve productivity even though he may have to ruffle some feathers in other departments to ensure that the Equipment staff receives the cooperation and assistance it requires.

A major role is played by the Maintenance Chief who is responsible for setting up a comprehensive preventive maintenance and servicing program complete with schedules, methods, and controls. It is his job to see that the Foremen are trained and assisted on "how to manage" so that they may keep their staff gainfully employed at all times. Then there is the "follow through" to ensure that proper planning, training and communications prevail and non-productive labour hours are reduced to a minimum. Finally there is the use of automatic tools and equipment, jigs and fixtures, preferred methods, and other such devices which permit the worker to do a better job in less time. At the worker's level the success of such a program is enjoyed through better working conditions which breed worker interest and enthusiasm.

Workmanship, quality and reliability should also be considered since premature component failure, road calls and repeat work represent labour and material dollars poorly spent and a loss in productivity. The major activities undertaken in a transit garage - maintenance, inspection, servicing and miscellaneous garage operations - together with the support functions of Stores and Buildings and Plant are all candidates for review to determine how productivity may be improved.

Following your systematic Phase I assessment, a report should be prepared. It would list those improvements in your equipment and plant maintenance operation that can be implemented in the short term and those that would be candidates for further assessment in Phase Two.